

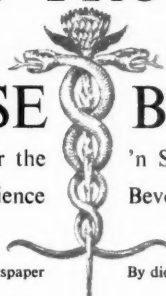
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# MEDICAL PROCEEDINGS

## MEDIESE BYDRAES

A South African Journal for the  
Advancement of Medical Science

'n Suid-Afrikaanse Tydskrif vir die  
Bevordering van die Geneeskunde



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IN THIS ISSUE · IN HIERDIE UITGAWE

The Heyns Decompression Apparatus for the Management of Labour  
Die Heyns-dekompresie-apparaat vir die Behandeling van Bevallings  
Staphylococcal Infections : Stafilokokke-Infeksies

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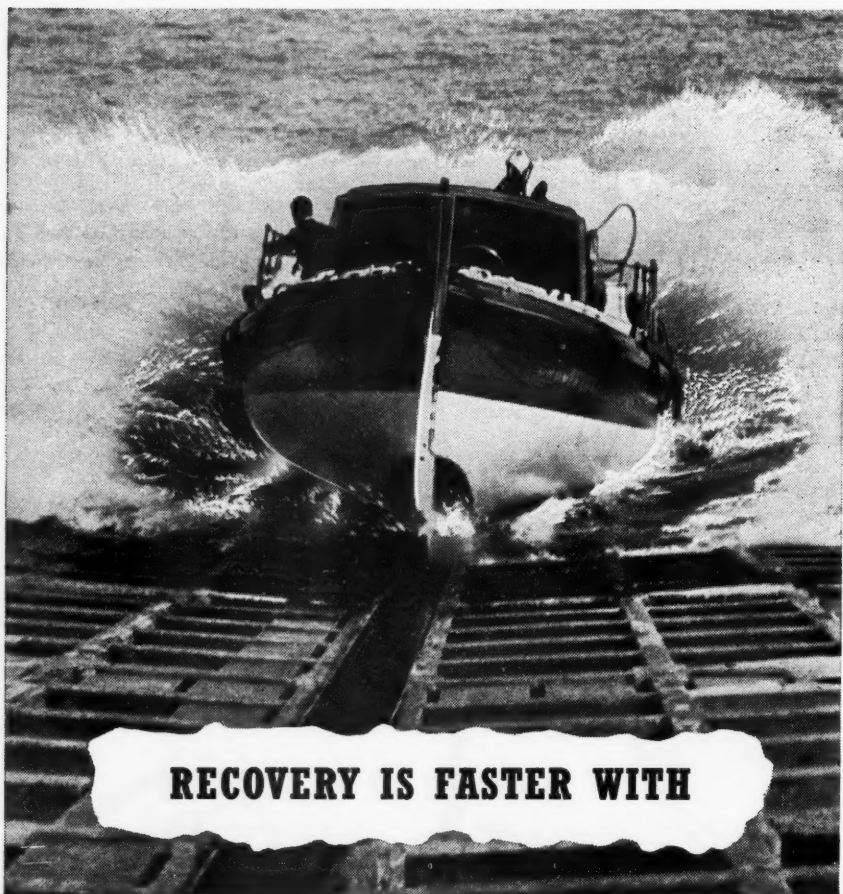
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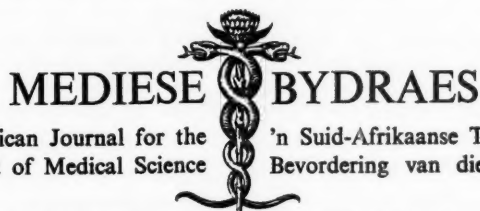
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## EDITORIAL · REDAKSIONEEL

### A NEW TECHNIQUE FOR THE MANAGEMENT OF LABOUR

#### THE HEYNS DECOMPRESSION APPARATUS

Elsewhere in this issue we publish the first report to be released on what must be regarded as one of the most spectacular contributions yet made to the management of labour. In this communication Prof. O. S. Heyns (of the University of the Witwatersrand) has made an outstanding addition to the techniques of midwifery. The first stage can now be reduced to half of the average time, or less than half, and there is substantial pain relief in over 90% of labours. This will surely rank as a highlight of achievement in the history of obstetrics.

It emerges from Professor Heyns' observations that the anterior abdominal wall must yield to permit effective uterine contraction. Simple inspection of the behaviour of the abdomen during first stage contractions establishes this proposition. The uterus therefore must dissipate much of its energy in overcoming a resistant abdominal wall. This tense wall also forces the uterus into an unfavourable axis, the organ being bent on itself at the sacral promontory. These faulty axes are present whether the head is engaged or not. This combination of factors prevents the uterus from assuming an optimal spherical shape which appears to be a *sine qua non* for dilatation of the cervix.

The logical application of this theory is to decompress the abdomen during labour, so that the anterior wall can bulge forward and thus diminish the unnecessary resistance which the uterus must overcome during its contractions.

### 'N NUWE TEGNIEK VIR DIE BEHANDELING VAN BEVALLINGS

#### DIE HEYNS-DEKOMPRESSIE-APPARAAT

Elders in hierdie uitgawe publiseer ons die eerste vrygestelde verslag oor wat beskou kan word as een van die skouspelagtigste bydraes wat nog ooit tot die behandeling van bevallings gedoen is. In hierdie mededeling beskryf prof. O. S. Heyns (van die Universiteit van die Witwatersrand) 'n voortreflike toevoegsel tot die tegniek van die verloskunde. Die eerste stadium kan nou tot die helfte of minder as die helfte van die gemiddelde tyd verminder word, en in meer as 90% van die bevallings is daar ook aansienlike verligting van pyn. Dit kan dus beslis beskou word as een van die prestasie-hoogtepunte in die geskiedenis van die verloskunde.

Uit prof. Heyns se waarnemings blyk dat die voorste buikwand moet meegê om doeltreffende sametrekking van die baarmoeder toe te laat. 'n Eenvoudige inspeksie van die gedrag van die buik gedurende eerste-stadiumsame-trekkings beaam hierdie stelling. Die baarmoeder moet gevolglik veel van sy energie verkwis met die oormoestering van 'n buikwand wat weerstand bied. Hierdie gespanne wand dwing die baarmoeder ook in 'n ongunstige spil in, en die orgaan word as 't ware oor homself gebuig by die sakrale uitsteeksel. Hierdie foutiewe spille is aanwesig of die kop nou al die bekkenrand binnegegaan het of nie. So 'n samestelling van faktore verhoed die baarmoeder om die optimale bolvormige fatsoen aan te neem wat skynbaar 'n *sine qua non* vir die verwyding van die baarmoedernek is.

This will facilitate uterine action and make it more efficient. Incidentally, by this manoeuvre labour is stimulated even when early and while the contractions are very weak.

Decompression of the abdomen has thus been based on a rational approach to the mechanism of labour and has been made possible by an ingenious apparatus developed by the author. Delivery is managed in the ordinary way, with the patient in the decompression suit. When the patient decompresses her abdomen, the length and the strength of the uterine contractions are increased. The os is often fully dilated in 1-3 hours, even in primigravidae. Difficult though it is to evaluate a subjective feature such as pain, there is little doubt that its relief is substantial and remarkable.\*

Professor Heyns' analysis of the significant features determining the ease of labour also throws light on why the variety of mental relaxation procedures advocated in different parts of the world, has undoubtedly been successful in some measure. He has pointed the way to the probable final common path which techniques of mental or muscular relaxation follow in facilitating labour and removing its fears.

It is important to emphasize that foetal distress is not observed during the decompression procedure, and equally important, that late rupture of the membranes is characteristic of this technique. There are therefore no grounds for fears about early rupture of the bag of waters and interference with dilatation of the os.

Possibly the most important finding to emerge from this work at present is the dramatic relief of pain during labour. The mere fact that labour is so strikingly shortened means that there is less time in which the parturient has an opportunity to feel pain; the quantum of pain is therefore less on this account alone. But, in addition, the quality of the pain is so altered that in 50% of the cases it is actually regarded as trivial. A woman in labour can read a book at her ease when the os is over half dilated—a stage when pain is usually exquisite.

Another beneficial consequence of decompression is that when the parturient reaches the

Die logiese toepassing van hierdie teorie is dus die dekompressie van die buik tydens bevalling, sodat die voorste wand vorentoe kan bol en daardeur die onnodige weerstand kan verminder wat deur die baarmoeder tydens sy sametrekking te bowe gekom moet word. Dit sal die baarmoederwerking vergemaklik en dit ook doeltreffender maak. Deur hierdie maneuer, tussen hakies, word bevalling gestimuleer selfs wanneer dit vroegtydig is en terwyl die sametrekking nog baie swak is.

Dekompressie van die buik is dus gegrond op die rasonale benadering van die meganisme van bevalling, en word moontlik gemaak deur die vindingryke apparaat wat deur die skrywer ontwikkel is. Die bevalling word op die gewone manier behandel, met die pasiënt in die dekompressiepak. As die pasiënt tot die dekompressie van haar buik oorgaan, word die tydskedule en die krag van die baarmoeder-sametrekking vermeerder. Die os is dikwels ten volle verwyd binne 1-3 uur, selfs by eerste bevallings. Hoewel dit baie moeilik is om 'n subjektiewe kenmerk soos pyn te evalueer, bestaan daar min twyfel dat die verligting aansienlik en merkwaardig is.\*

Prof. Hyns se ontleding van die betekenisvolle kenmerke wat die gemaklikheid van bevalling bepaal, werp ook lig op die redes waarom die verskeidenheid van geestesverslappende prosedures wat in verskillende dele van die wêreld aan die hand gedoen word, ongetwyfeld met 'n sekere mate van welslae bekroon is. Hy het die weg aangedui na die waarskynlike finale gemeenskaplike pad wat deur die tegnieke van geestes- of spierverslapping gevolg sal word om bevallings te vergemaklik en vrees te verwyder.

Dit is van belang om klem daarop te lê dat fetussen nie tydens die dekompressieprosedure waargeneem is nie, en, van ewe groot belang, dat die late verbreking van die vliese kenmerkend van hierdie tegniek is. Daar is derhalwe geen grond vir enige vrees oor die vroeë verbreking van die watersak en inmenging met die verwyding van die os nie.

Die belangrikste bevinding wat hierdie werk opgelewer het, is op die oomblik miskien die dramatiese verligting van pyn tydens bevalling. Die blote feit dat die bevallingstyd so merkwaardig verkort word, beteken dat daar minder tyd vir die vrou in barenswee is om van pyn bewus te word; om hierdie rede alleen word die kwantum van pyn verminder. Maar afgesien hiervan word ook die kwaliteit van die pyn in so 'n mate verander dat dit in 50% van die gevalle in werklikheid as onbenullig beskou is. 'n Vrou kan tydens haar bevalling maklik 'n boek lê en lees wanneer die os meer as halfpad verwyd is.

\* We shall be publishing shortly a report by Dr. D. Friedberg on a multiparous female whose abdominal musculature was completely paralysed as a result of poliomyelitis. She became pregnant and went to term normally. Her labour was painless and lasted in all for 3½ hours. The first stage took about 2½ hours. Thus Nature's own experiment verifies Professor Heyns' hypothesis.

\* Ons publiseer eersdaags 'n verslag deur dr. D. Friedberg oor 'n multipara-vrou wie se buikspierstelsel geheel en al ten gevolge van poliomiëlitis verlam is. Sy het weer swanger geword en het die einde van tydperk op 'n heeltemal normale manier bereik. Haar bevalling het sonder pyn geskied en het altesaam 3½ uur lank geduur. Die eerste stadium het ongeveer 2½ uur in beslag geneem. Prof. Heyns se hipotese word dus deur die natuur se eie eksperiment beaam.



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second stage of labour, she is physically fresh and mentally confident. This facilitates the second stage vastly.

The argument is likely to be advanced that the relief of pain is psychogenic and not due to the decompression. This, however, is not an objection to the use of the apparatus, which ensures short, safe, comfortable labours of great satisfaction to the parturient. It puts at our disposal an objective and physical technique for mastering the problems of labour, especially in primigravidae. A further paper dealing with the use of the decompression apparatus in clinical practice will be published soon in the pages of this journal.

We await with interest the results of the use of decompression in other parts of South Africa, and in other countries. Professor Heyns' contribution may well revolutionize the practice of obstetrics and it is a matter for gratification that an important and original contribution to the practice of medicine has emerged from one of our own Medical Schools.

#### STAPHYLOCOCCAL INFECTIONS

In the U.S.A. last year there was a *National Conference on Hospital-Acquired Staphylococcal Disease*. During the same year, the *Lancet* launched an intensive attack on this problem (4 major and many minor editorials were published in the pages of this one journal alone). The latest salvo in this campaign is the important *Report*<sup>1</sup> on *Staphylococcal Infections in Hospitals* which has just been issued by the Lord Cohen Committee, a Sub-Committee of the Standing Medical Advisory Committee of the Central Health Services Council in the United Kingdom.

The seriousness of the state of affairs is now fairly generally appreciated, and energetic attempts are being made to combat the situation which has developed. Although many of the preventive recommendations in the *Report* seem unlikely to be applied in practice, it does, nevertheless, contain much valuable advice.

The position to-day is that 'the more dangerous types of staphylococcus are often resistant to several of the major antibiotics.'<sup>2</sup> Yow *et al.*, as summarized in the *Lancet* recently,<sup>3</sup> report that in their experience, 'penicillin, streptomycin, and the tetracyclines are now

En gewoonlik is dit die stadium wanneer die pyn groot afmetings aanneem.

'n Verdere heilsame gevolg van dekompressie is dat wanneer die vrou in barensweë die tweede stadium van bevalling bereik sy liggaamlik onuitgeput en vol vertroue is. Dit vergemaklik die tweede stadium oneindig.

Die argument sal waarskynlik geopper word dat die verligting van pyn psigogenies is en nie aan dekompressie toegeskryf kan word nie. Dit kan egter nie aanvaar word as 'n gegronde beswaar teen die gebruik van die apparaat wat kort, veilige en gerieflike bevallings verseker, tot groot bevrediging van die vrou in barensweë nie. Dit plaas tot ons beskikking 'n objektiewe en fisiese tegniek vir die oormettering van die probleme van bevalling, veral die probleme wat deur eerste bevallings opgelewer word. 'n Verdere referaat oor die gebruik van die dekompressie-apparaat in die kliniese praktyk sal binnekort in hierdie tydskrif gepubliseer word.

Ons wag met belangstelling op die resultate van die toepassing van dekompressie in ander dele van Suid-Afrika en in ander lande. Prof. Heyns se bydrae kan bes moontlik 'n algehele omwenteling in die verloskundige praktyk teweegbring, en dit is verblydend dat so 'n belangrike en oorspronklike bydrae tot die geneeskundige praktyk die eerste lig in een van ons eie mediese skole gesien het.

#### STAFILOKOKKE-INFEKSIES

'n Nasionale Konferensie oor die Stafilokokke-infeksies wat in hospitale opgedoen word, het verlede jaar in die Verenigde State plaasgevind. Gedurende dieselfde jaar het die *Lancet* 'n intensiewe veldtog in verband met hierdie probleem van stapel gestuur (4 groot en 'n hele paar kleiner inleidingsartikels het in hierdie tydskrif alleen verskyn). Die jongste salvo in die veldtog is die belangrike Verslag<sup>1</sup> oor Stafilokokke-infeksies in Hospitale wat so pas gepubliseer is deur die Lord Cohen-komitee, 'n onderkomitee van die Vaste Mediese Adviserende Komitee van die Sentrale Gesondheidsdiensteraad in die Verenigde Koninkryk.

Die erns van die posisie word vandag alreë besef, en kragdadige pogings word aangewend om die toestand wat ontstaan het, die hoof te bied. Hoewel baie van die preventiewe aanbevelings in bogenoemde Verslag waarskynlik nie in die praktyk toegepas sal word nie, bevat die Verslag nietemin veel waardevolle advies.

Die posisie vandag is dat 'die gevaarliker stafilokokke-tipes dikwels weerstandskragtig is vir sover dit etlike van die belangrikste antibiotica betref.'<sup>2</sup> Yow *et al.*, 'n opsomming van wie se bevindings onlangs in die *Lancet* ver-

1. Report of the Sub-Committee of the Standing Medical Advisory Committee of the Central Health Services Council (1959): London: H.M. Stationery Office, 2s. 6d.

2. Editorial (1959): *Brit. Med. J.*, 1, 218.

3. Editorial (1959): *Lancet*, 1, 186.

1. Verslag van die Onderkomitee van die Vaste Mediese Adviserende Komitee van die Sentrale Gesondheidsdiensteraad (1959): Londen, H.M. Stationery Office, 2s. 6d.

2. Redaksioneel (1959): *Brit. Med. J.*, 1, 218.

rarely active against hospital staphylococci. For mild or moderate infections they have turned to novobiocin, chloramphenicol, ristocetin, erythromycin, or oleandomycin, and for severe infections to kanamycin, vancomycin, or bacitracin. Thus we have still some resources which have not been fully explored . . .'

All these facts underline the importance of emphasis on the judicious use of antibiotics. But the recent discussions of the grave problem posed by staphylococcal infection appear to have overlooked one important and promising field of inquiry, i.e. an attack on the staphylococcus with its own weapons, viz. staphylococcus toxoid.

The antigenicity of the toxoid is by now well established. The evidence is based on its parenteral administration. There can be no doubt that the injection of the toxoid is painful and accompanied by fairly severe side effects. The need to inject the toxoid has therefore limited its use in clinical practice to refractory chronic infections, where it has only been adopted as a measure of last resort. (A course consists of from 10-20 injections). The prophylactic use of parenteral toxoid was entirely out of the question, and swallowing the toxoid was totally ineffective.

Recently, however, Janovics<sup>4</sup> has demonstrated experimentally in rabbits that staphylococcus toxoid, when applied to the oral or nasal mucosa, produces a titre of antitoxin in the serum as great as that resulting from injection of the toxoid. Janovics has modified the unsatisfactory water-insoluble alum-precipitated toxoid and has produced a soluble toxoid which stimulates antibody formation more consistently, and can be applied nasally or sublingually. He has also shown that the immunity produced is not strain-specific, i.e. the toxoid from a single strain of staphylococcus neutralizes the toxins produced by other strains of toxigenic staphylococci.

Soluble toxoid taken sublingually is painless and unaccompanied by side effects. The clinical evaluation of this method of attack on

skyn het,<sup>3</sup> rapporteer dat hul ondervinding hulle geleer het dat penisillien, streptomisien en die tetrasikliene tans selde aktief teen hospitaal-stafilokokke is. Vir ligte of middelmagtige infeksies maak hulle dus staat op novobiosien, chlooramfenikol, ristosetien, eritromisien of oleandomisien, en, in die geval van ernstige infeksies, op kanamisien, vancomisien of basitrasien. Ons beskik dus oor 'n aantal hulpbronne wat nog nie ten volle geëksploreer is nie . . .

Al hierdie feite onderstreep die belangrikheid daarvan om steeds klem te lê op die oordeelkundige gebruik van antibiotica. Maar dit skyn asof een belangrike en belowende navoringsgebied, nl. 'n aanval op staflokokke met hul eie wapens, d.w.s. staflokokke-toksoïed, oor die hoof gesien is tydens die onlangse besprekings van die ernstige probleem wat deur staflokokke-infeksie opgelewer word.

Oor die antigenisiteit van die toksoïed bestaan daar nie langer enige twyfel nie. Die getuienis is gegrond op die parenterale toediening daarvan. Sonder die minste twyfel is die inspuiting van die toksoïed pynlik en gaan dit vergesels van betreklike ernstige newe-effekte. Die noodsaaklikheid om die toksoïed in te spuit, het die kliniese gebruik daarvan dus beperk tot die behandeling van hardnekige chroniese infeksies, en selfs dan word dit net in die heel laaste instansie gedoen. (Die behandeling bestaan uit tussen 10 en 20 inspuitings). Die profylaktiese gebruik van 'n parenterale toksoïed was heeltemal buite die kwessie, en die insluk van die toksoïed was volkome ondoeltreffend.

Onlangs het Janovics<sup>4</sup> egter proefondervindelik met konyne gedemonstreer dat as 'n staflokokke-toksoïed deur die mond- en neusslymvliese ingeneem word, dit 'n titer van antitoksien in die serum oplewer wat net so groot is soos dié volgende op die inspuiting van die toksoïed. Janovics het die onbevredigende, in water onoplosbare, aluin-gepresipiteerde toksoïed gewysig en het 'n oplosbare toksoïed geproduseer wat die vorming van teenliggame op 'n standhoudende wyse stimuleer, en of deur die neus of ondertongs toegedien kan word. Hy het ook aangetoon dat die immunisasie wat hierop volg nie soort-spesifiek is nie, d.w.s. die toksoïed van 'n en-

3. Redaksioneel (1959): *Lancet*, **1**, 186.

4. Janovics, A. (1958): *S. Afr. J. Lab. Clin. Med.*, **4**, 262.

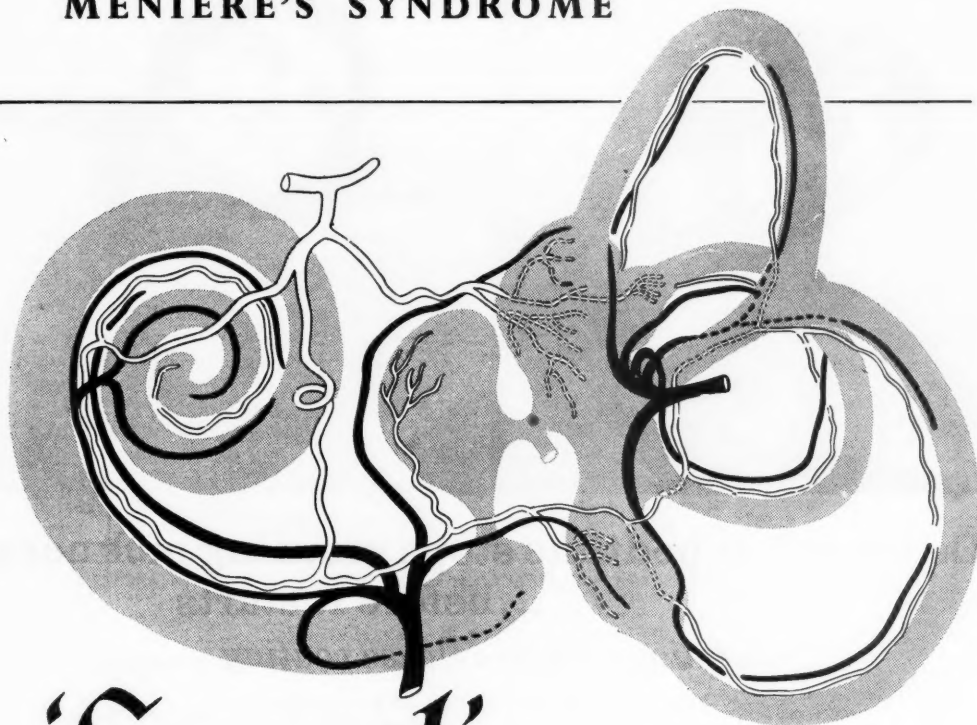
Deur die een of ander merkwaardige redaksionele fout (waarvoor die skrywer ongetwyfeld nie verantwoordelik was nie) is 'n hele paar bladsye van hierdie artikel deurmekaargegooi, waardeur die opeenvolgende deurlusing van hierdie belangrike dokument feitlik 'n taak vir die mediese bloedhond geword het. Hierdie agtelose hantering van 'n belangrike en verdienstelike wetenskaplike manuskrip is te meer te betreuer in die huidige geval want die skrywer doen verslag oor vorderings wat op die gebied van die immunologie gemaak is.

4. Janovics, A. (1958): *S. Afr. J. Lab. Clin. Med.*, **4**, 262.

By some remarkable quirk of editing (for which the author was clearly not responsible) numerous pages of this article have been apple-pied, thus making the sequential perusal of this important document virtually a task for a medical bloodhound. This slap-dash handling of a scientific MS. of great interest and merit is the more deplorable in the present case, because of the considerable immunological advances reported by the writer.

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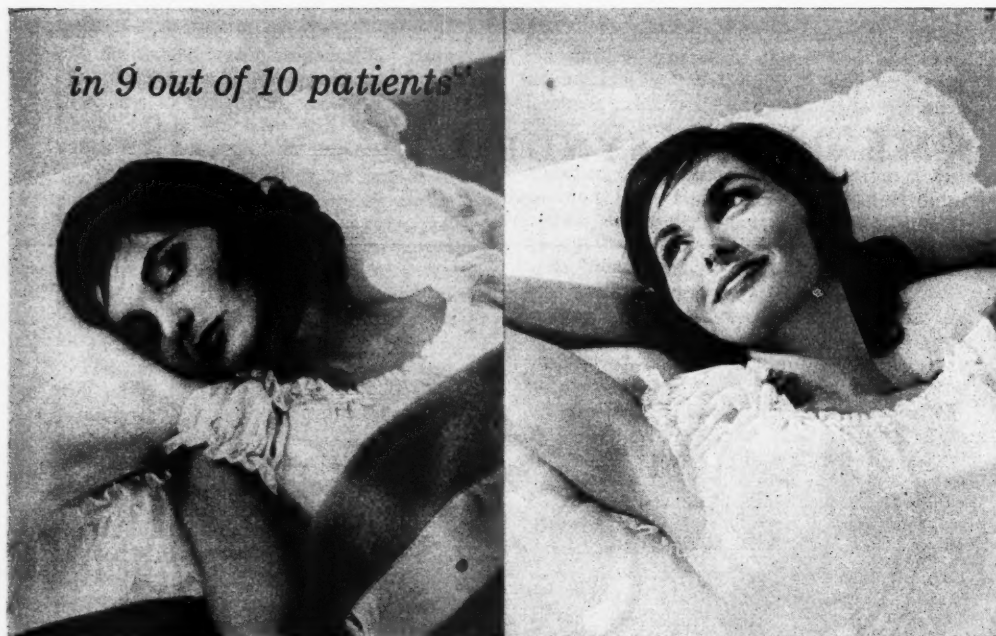
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References: 1. Nulsen. R. O.: *Ohio State M. J.* 53:665, June, 1957.  
2. Personal Communications, 1956-57.

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resistant infections is therefore certain to be attempted and the results will be awaited with considerable interest.

Its scope should be very great. It will have a prophylactic role before elective surgery, and this should prevent the supervention of infection by antibiotic-resistant staphylococci, thus restoring to antibiotics their effective antibacterial role.

The simplicity and painlessness of the administration of the toxoid should open up a wide field of treatment in the case of infections for which all other chemotherapy has proved unavailing; nor may it be without a place in the institutional management of labour. There is reason to believe that the newly born infant will be protected by a significant antibody titre if the toxoid is given to the mother in the latter part of pregnancy<sup>5</sup>.

This development in the field of immunology reflects the versatility and the ingenuity of the methods we can employ against infection. It is interesting to reflect that the seeds for the destruction of the staphylococcus lie buried within the micro-organism itself.

5. Wright, G. P. and Clark, W. M. (1944): Brit. Med. J., 2, 146.

kele soort stafilococcus neutraliseer ook die toksiene wat deur ander soorte toksigeniese stafilocokke geproduseer word.

Oplosbare toksoïede wat ondertongs geneem word, veroorsaak geen pyn en gaan nie vergesel van newe-effekte nie. Dit is derhalwe 'n uitgemaakte saak dat 'n poging aangewend sal word om die waarde van hierdie aanvalsmetode op weerstandskragtige infeksies klinies te evalueer, en die resultate daarvan word met groot belangstelling afgewag.

Die bestek behoort baie groot te wees. Dit kan 'n profilaktiese rol vóór elektiewe chirurgie speel, iets wat die tussenkoms van infeksie deur antibiotikum-weerstandskragtige stafilocokke behoort te voorkom, en dus die doeltreffende anti-bakteriese rol van die antibiotica behoort te herstel.

Die feit dat die toediening van die toksoïed so eenvoudig en sonder pyn geskied, behoort 'n uitgestrekte behandelingsveld oop te stel in die geval van infeksies waar alle ander vorms van chemoterapie misluk het; miskien sal dit ook 'n plek verwerf in die behandeling van bevallings in hospitale. Daar is rede om te glo dat die pasgebore babetjie beskerm sal word deur 'n betekenisvolle teenliggaam-titer indien die toksoïed aan die moeder gedurende die laaste gedeelte van die swangerskapstermyn gegee word.<sup>5</sup>

Hierdie ontwikkeling op die gebied van immunologie is 'n mooi weerspieëling van die veelsydigheid en die vindingrykheid van die metodes wat ons teen infeksie kan toepas. Dit is interessant om daaraan te dink dat die kiem van die stafilocokke se vernietiging in die mikro-organismes self rondgedra word.

5. Wright, G. P. en Clark, W. M. (1944): Brit. Med. J., 2, 146.

## ABDOMINAL DECOMPRESSION IN PREGNANCY AND LABOUR

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A method has been devised whereby decompression is used to facilitate parturition. By this means the first stage of labour has been shortened to such an extent that in two thirds to three quarters of cases one, or at most two-finger dilatation of the os has proceeded to full dilatation within 5 hours. An additional feature of the first stage has been a substantial relief of pain, almost invariably appreciable, and sometimes to the extent of 70-100%.

The second and third stages have also been treated by decompression of the pelvic outlet or the vulva. These stages are short and their technical problems have been solved, but they will be left in abeyance for the present, as the first stage has presented the main research challenge. Attention will, for the time being, be confined to this aspect of parturition.

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### PROGRESS AND ACHIEVEMENT OF THE INVESTIGATION

In May 1954, in collaboration with Halliday, certain observations were made on the contour of an abdomen, the musculature of which had been paralysed with Scoline. There had been the question whether the abdominal wall, in part at least, was the source of the electrical potentials we recorded in labour. A reliable record of the changes in contour of the abdomen during uterine contraction was the first step. It was thought necessary to paralyse the musculature and, after much anxious consideration, the late Dr. Devitt (who was second-in-command in the Anaesthetics Department) agreed to give a series of anaesthetics with Scoline. A continuous cinematographic record was made.

Two points have to be mentioned. The first was the doubt whether the uterus would con-



tract under the anaesthesia (Pentothal) necessary. The paralysis of the diaphragm causes so much distress that unconsciousness of the subject has to be induced. The second point dealt with the experimental need to stretch the muscular abdominal walls (if possible naturally from within the abdomen, as does the contracting uterus) in order to discover what electrical impulses result. It had not been possible to devise any means of stretching the abdominal wall suitably, and we had to rely on the contracting uterus to accomplish this.

The dramatic feature of the first case and then the second 10 weeks later (3 August 1954) was the rapidity with which the cervical os dilated. The first subject, a primigravida, had dilatation to over 3 fingers in 68 minutes from a state of being probably not in labour. To the best of our knowledge, she was in definite labour for not more than 6 hours. This supreme eutocia was only remarked in passing. The second patient, a 2-para, was having painless contractions at the time she was considered for the experiment and, with an os  $1\frac{1}{2}$  fingers dilated, she appeared to be at best in spurious labour. The record ended 35 minutes after giving Pentothal and she appeared to have had 11 contractions. Rectal examination showed full dilatation of the os and she was delivered 6 minutes later.

It was now felt that something of importance was happening, and it was resolved to observe the matter closely. The next case, undertaken 8 days later, had 3 contractions during the experiment, but labour ceased thereafter.

Consideration was now given to the mechanics of the abdominal cavity and its walls. Curarizing and anaesthetic techniques were meanwhile abandoned. When the effect of the abdominal musculature on the uterus in labour was better understood, a method was sought whereby the muscles could be influenced experimentally, and to discover what effect this might have on cervical dilatation.

The reasoning at this stage may be stated as follows:

Dick Read relaxed the general, and by chance also the abdominal, musculature by repeated suggestion.

When at first a safe and effective technique seemed to be unobtainable, one had in desperation to consider hypnotism. It was obvious that pronounced relaxation of the abdominal muscles of the flank was something outside usual experience. The question also arose whether the flat muscles were under voluntary

influence. It would accordingly require training during hypnotism to get the subject to understand what neuro-muscular actions were required. Suggestion would have to be directed to the idea of a belly which is full from over-eating.

Local analgesia might have to be extensive and reach the level of the 6th dorsal vertebra. For this purpose, however, the rectus abdominis has attracted most of the attention. This is probably correct, for it is quick acting and is the voluntary anterior wall muscle *par excellence*. The flat muscles are concerned with changes in capacity and pressure inside the abdominal cavity. Epidural analgesia was clearly the most desirable method for the purpose, but anaesthetists tend to be diffident about using this route. Intrathecal spinal analgesia often has such unpleasant sequelae that its experimental use was undesirable. All that remained was the curare-like relaxant. It was decided to use Scoline. Light anaesthesia was required, because it is very distressing for the patient to be conscious of paralysis of the diaphragm. The unexpected finding had been made that uterine activity was not abolished by anaesthesia and, in fact, it appeared that Scoline exhibited an oxytocic effect. The result of these experiments had been great acceleration of the dilatation of the os.

It was concluded that enforced relaxation or stretching of the abdominal musculature amounting almost to paresis might be an important step forward. Dick Read's relaxation was uncertain and could be nullified in the timid by fear, anxiety and a loss of morale. Hypnotism might be precarious because few women could be expected to be sufficiently good subjects to respond to the requirements. The control of relaxation had to be certain in order to hold out a promise of any value, and the muscle stretch had to exceed what was normally found. While Scoline might be satisfactory for experimental trials, a method had to be found that was less perilous and arduous.

The idea had been considered that the reduction of the atmospheric pressure outside the abdomen to about one fifth of an atmosphere might relax the abdominal musculature and perhaps allow the wall to bulge forward. While our belief in this possibility was firm, it was met with incredulity by others. It was pointed out, however, that the intestinal gas of the subject would expand because of a decrease in pressure, and would thus stretch the abdominal wall to some extent. There were the additional arguments that (a) descent of the diaphragm would result from the atmospheric pressure of



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the inspired air opposing the low pressure of the abdominal cavity, and (b) that at one fifth of an atmosphere half-a-ton of weight is taken off a large abdominal wall.

Experimental facilities were extended to us by the Assistant Surgeon-General (Air), Central Medical Establishment, South African Air Force. A decompression chamber in use for flying personnel at Lyttelton was at our disposal. The significant experiment was done with the Kifa type of cuirass that is placed over the thorax in poliomyelitis patients. Partial exhaustion was effected by means of the powerful pump available. We fitted the cuirass over the abdomen and observed abdominal effects at pressures of 500 mm., 400 mm., and 300 mm. Hg. The atmospheric pressure at Lyttelton was 650 mm. Hg. (altitude 4,700 feet). It was conclusively demonstrated that the abdominal wall projected forward on decompression, and it was found that powerful retraction of the abdominal wall could not be maintained during decompression. It was possible to speak without effort at a pressure of 500 mm. Hg, but at 400 mm. speech came in a whisper.

It was judged that parturients would feel apprehension at pressures below 500 mm. Hg, but it was certain that at this two thirds of a full atmosphere the muscle stretch would be sufficient for the purpose under consideration.

Between 29 April and 21 September 1955 another 11 cases were treated with Scoline in early labour. About half the cases gave a poor response during anaesthesia, although some of these did well subsequently. Meanwhile endeavours were being made to construct a small chamber to fit on to the anterior abdominal wall, to devise a means of sealing, and to discover of what capacity the roughing exhaustion pump would have to be. Delay was caused mainly by the bonding of the rubber seal to the metal and getting it to fit the abdomen, but the first parturient was treated with decompression in November 1955. There were 2 cases on 15 November, each one being so spectacular that the method gave promise of something unusual. Both were young primigravidae in the very earliest of labour. The first one was delivered in 3 hours after the start of decompression and the second in 2 hours 20 minutes. Decompression was not intended for second stage use. However, the second stages were short and the most notable feature at the time was the relaxation of the patients, and their freshness. The short duration of this stage was dramatic.

## DISCUSSION

During the first stage of labour, when the uterus contracts, the anterior abdominal wall is pushed forward and stretched by the uterus. The energy responsible for this originates entirely in the uterus. It is necessary to visualize the relaxed uterus as hanging loosely and extending on either side of the lumbar vertebral column. Its shape is such that it has one long axis and two quite short ones. Abdominal palpation puts this statement beyond all possibility of doubt. The growing uterus has taken the shape of the abdominal cavity, which possesses similar axes. As a result the uterus is like a balloon that has been compressed antero-posteriorly and is accordingly rather sausage-shaped. When this happens to a balloon with contents of constant volume it must stretch—and so does the uterus. The abdominal cavity is entirely filled with its permanent contents and, if anything further is to be introduced into it, the only possibility of expansion is forward and to some extent laterally because of the stretching of the muscular wall. Space would be gained over the entire supero-inferior diameter for every unit of gain in the antero-posterior. Therefore an organ growing in such a cavity must, if compressible, assume an elongated shape with a shorter antero-posterior axis than if it had remained spherical. It may be remarked that the spherical uterus seen in a pendulous abdomen would hold the necessary contents with less stretching than the sausage-shaped viscus. The pregnant uterus appears to be naturally round and, when there is sufficient tone or tension in its wall to overcome resisting forces, it will change its shape towards the spherical.

We may consider 3 effects of a uterine contraction in its early phase:

1. To the extent that it is isotonic, the wall will shorten, but without reducing the volume of the contents, which are incompressible.

2. As the uterus becomes rounder its available internal volume must increase. Instead of forming vacuums the myometrium shortens. (It seems obvious that without shortening the placenta would never separate and, if separation were to be effected manually or by haemorrhage, the parturient would quickly bleed to death).

3. To become spherical, the flattened compressed uterus must gain in the length of its antero-posterior and possibly transverse axes. This requires the anterior abdominal wall to give. We know from simple inspection that

it does so give, and that the upper abdominal wall moves well forward during a first stage contraction.

Therefore, if the abdominal wall yields freely, uterine contraction will effectively undo distortion by raising the viscus from its para-vertebral flaccidity to a prevertebral erection of spherical shape. If the abdominal wall does not force the uterus back again, the so-called retraction will be highly efficient, for after every contraction the full shortening of the muscle will remain without any subsequent lengthening. The shortening normally occurs in the upper uterus partly because it is in the upper abdomen that change of shape can occur freely. The rearrangement of the myometrium lays the foundation, as it were, for dilatation of the cervix.

It is depressing to think of the reverse of this picture, which is in fact the normal state of affairs. In addition to what has been thus far considered, including the fact that the uterus dissipates much of its energy in overcoming a resistant abdominal wall, another result of tense abdominal musculature is the retention of the uterus in an unfavourable axis. Not only does the long axis of the foetus lie at a considerable angle to the axis of the brim, but the upper segment is at an angle to the lower so that the uterus is bent on itself or kinked at the sacral promontory. These faulty axes are present whether the foetal head is engaged or not. In the presence of a high tension myometrium the kink would tend to straighten out, thus bringing the fundus forward.

The first proposition is made. It is simply that the resistance to stretch of the muscular abdominal wall is a factor opposing cervical dilatation.

If this proposition is substantiated, there is an explanation for Dick Read's concept of relaxation. Whereas he said tense mind, tense cervix, the truth lies in the fact that unresisting abdominal muscles allow the corpus uteri to come forward and to be in line with the resisting cervix. Apprehension alone will cause tension of the abdominal muscles, force the viscus back on to and over the spine, and reduce uterine efficiency even to the point of inertia. The uterus itself will be producing the energy, but it will have to do so much more while working isometrically. If it is tending to become rounder even though prevented from changing its shape by the abdominal musculature, amniotic pressure will drop and some value be gained.

#### ABDOMINAL CAVITY

Decompression as applied to the abdomen in labour is not an empirical method. The two primary factors in the rationale are uterine and diaphragmatic action, and the former has now been considered. However, variations in the mechanism and technique for the second and third stages of labour require that the elementary structural and mechanical features of thorax, diaphragm, abdomen, pelvic girdle and pelvic floor be appreciated.

1. *Pressure.* The intra-abdominal pressure is at least atmospheric: the extra-abdominal weight of the atmosphere must of necessity compress the soft, flexible muscle walls so as to equalize the pressure inside and outside of these walls. It was found profitable to contemplate some of the more obvious effects of changes in abdominal shape and pressure, and it became clear that the subject was one of importance and offered fruitful applications both in health and disease.

2. *Mechanics.* A moment of reflection will suffice to bring to mind that the abdominal cavity is a single chamber (the pelvis being included) with the diaphragm as roof and with the pelvic floor below, the antero-lateral walls being muscular and fascial. The vertebral column, pelvis and rigid thoracic cage provide for stable origins and insertions of the muscles. The abdominal contents fill it entirely and without leaving any dead spaces. Within the viscera there may be gas, liquid and solid; but externally they are in close apposition and quite firmly pressed together. On the antero-lateral abdominal wall alone there is a weight due to the pressure of the atmosphere of over half a ton. It is, therefore, not to be expected that a series of flat muscles of inconsiderable bulk could withstand such force sufficiently to allow intra-abdominal pressures below atmospheric. While it is possible, having regard to muscle power, it must, nevertheless, happen very rarely in nature that abdominal muscles are held contracted in a fixed position while the abdominal volume decreases and suffers a drop in pressure of perhaps a few mm. Hg. It is different when the region of the uppermost abdomen that lies within the lower costal cage is taken, for negative pressures occur during respiration and -11 mm. Hg has been recorded in the peritoneal cavity during decompression.

As the diaphragm is highly mobile and capable of reducing or increasing abdominal capacity by its descent or rise, it is necessary to appreciate its action very clearly. It may be

thought of as a piston moving up and down. If there really is an absolute movement, the abdominal contents will not only be forced downwards and their pressure increased, but they must also find room for themselves unless there is some intestinal gas that can be compressed. The structure that resists least is the abdominal musculature, and simple inspection shows how the wall bulges outwards during inspiration and recedes during expiration. The range of movement of the diaphragm is just over an inch in deep respiration, and about half an inch in quiet respiration. With the subject lying down the diaphragm is situated highest, but the dome descends in the erect posture, and it is even lower when sitting writing at a desk. The higher the diaphragm the greater its respiratory excursion.

The thorax and the abdomen are two adjacent compartments with the diaphragm as a common partition. At its simplest we may regard the pressure in the thorax (strictly speaking in the bronchial system) as being presided over by the glottis. If the thoracic pressure is below atmospheric, opening of the rima will allow air into the lung. The normal thoracic pressure may, therefore, be considered to be atmospheric. When decompression lowers the abdominal pressure on the other side of the diaphragm sufficiently, the diaphragm will be forced downwards in an attempt to equalize the pressures in the two chambers. The mechanism of increasing the capacity of the thorax is familiar to all, but it is necessary to point out that in abdominal breathing inspiration follows considerable increase in the girth of the lower costal cage which in itself causes an abdominal bulge. The movement is inevitable, because the flat muscles are fixed to the ribs. Thus the diaphragm reduces the supero-inferior axis of the abdomen, but there is an increase in the antero-posterior during forward bulging of the abdomen. During decompression of abdomen and lower thorax by 50—150 mm. Hg below atmospheric pressure, the increase in girth is very great at the level of the transpyloric plane, slight at the umbilical level, and not appreciable at the transtuberular plane. The abdominal musculature being so intimately associated with respiration, it is possible that the neurons dominating the muscles of respiration also preside over those of the abdomen.

3. *Morphology and Phylogeny.* For the foregoing reasons the important question arises of the extent to which there is voluntary control over the flat muscles of the abdomen. One possibility is that the oblique and

transverse muscles merely lengthen and shorten according to space requirements. In respect of this function it should be pointed out that the rectus abdominis differs greatly in its form and direction of fibres, and is strongly under voluntary influence. In most vertebrates the rectus abdominis extends from the shoulder region to the pelvis. As the sternum grows in length the rectus is restricted, and in mammals it is a purely abdominal muscle. It is in mammals that the diaphragm develops. Morphologically and because of its cervical nerve supply, it is thought that the musculature of the diaphragm originated from a superior portion of the rectus, perhaps in the shoulder region, and migrated downwards at an early stage of pre-mammalian history in association with the heart and the lungs.

Another function of the flat muscles seems to be postural. Because *Homo sapiens* is erect he has different requirements from quadrupeds when resisting gravity. These lateral hypaxial flat muscles go to constitute much of the body wall in fishes. Phylogenetically they are derived from the myotomes, but they arise in the embryo of at least some land vertebrates from mesenchyme in the body wall lateral to the myotomes. Mesenchyme gives origin to all smooth and cardiac musculature. In land life, as opposed to the aquatic, the function of supporting the trunk viscera is a new requirement. Then there develops in tetrapods a rib system of varying power and extent, but the continuity of the hypaxial musculature makes it conspicuously a unit. This develops into the subvertebral muscles dorsally and the rectus group ventrally, with the flank muscles following the curve of the trunk.

In tetrapods the flank muscles have little bulk and the bundles are scattered inside the periphery of the fascial covering of the belly. The muscle content suggests that it is included in the body wall for the purpose of contractility and because it affords greater stretching than fascia. In erect Man, on the other hand, the muscle fibres themselves arise from bone, are of greater volume absolutely and relatively, and finally have a great iliac crest from which to arise. This part of the ilium in tetrapods is very small. In the erect posture Man maintains his equilibrium with the help of the spinal muscles, but he must clearly make use of the abdominal musculature for versatility in poise and trunk agility. It is submitted that the flank muscles in Man are so powerful that their function may be mainly postural. It would not be surprising if subsequent study of chronaxie values shows them to be relatively



sluggish in response, and to a very small extent under voluntary control. Histological structure of the muscle and a clear demonstration of the nerve supply in animals is required, but it cannot be expected that a great deal of light will be shed by these methods.

These myological considerations throw light on the problem of gaining paresis or marked relaxation of the abdominal wall. This was originally a requirement for the study of abdominal contours, but later was found to aid the efficiency of the uterus in labour. A superficial assessment of the anatomy led to what may be an error, viz. that the infiltration with novocaine of only the rectus muscles was of small value. To provide local anaesthesia to the oblique and transverse muscles is an extensive undertaking reaching the mid-dorsal level. The recti can be directly infiltrated, but this would be undesirable for the entire abdominal wall. However, from what has been suggested, it now seems likely that in the abdominal wall the rectus is the striated muscle *par excellence*, and that its elimination must provide very nearly as great flaccidity of the parietes as is attainable. Our theory is that the flank muscles merely conform to the crude forces acting upon them; nor must we lose sight of the great part played by diaphragmatic paresis in giving more space at laparotomy.

4. *Surgical Anatomy.* For didactic purposes it has been found necessary to cite a few examples of applied anatomy in the abdomen, as these assist in making the student familiar with the problems under discussion. It may accordingly be of value to begin with a consideration of what happens when a suprapubic incision is made into the peritoneal cavity of a patient in the Trendelenburg position. Where the abdominal wall is fully relaxed gravitational force tends to pull the viscera towards the diaphragm. This does not cause a vacuum in the pelvic region because atmospheric pressure pushes in the paralysed abdominal wall and supports the inclined column of viscera. When the peritoneum is incised within a few inches of the pubes, air enters forcibly, sometimes whistling in audibly, and then the viscera descend. The phenomenon is due to the elevated region, the bony pelvis being incompressible.

At the level of the umbilicus the internal pressure is higher than atmospheric to the extent that there is tone or tension of the abdominal musculature. Here air cannot enter unless a low pressure space is made for it by pulling up the incised abdominal wall.

Nearer the pubes, however, atmospheric pressure supports mobile pelvic viscera, e.g. gut. The pelvic pressure is, therefore, less than atmospheric by the weight of its contents. Thus the outside air is under greater pressure than this region of the cavity, and it will flow in when the incision is made. It would obviously be good practice to blow air into the peritoneal cavity through a needle locally before making the incision. Whatever the response to this suggestion, the belief must not persist that a relaxed wall in the Trendelenburg position may be incised without danger to the underlying gut.

The diaphragm, in successful anaesthesia, is high anatomically and provides more intra-abdominal space in the Trendelenburg position; but the unresisting flank muscles also bulge outwards to bear the mobile organs descending by gravity. In the case of a tumour incarcerated in the pelvis the experience of letting in air behind by prizing it up is common. The explanation offered is that this phenomenon would occur where air enters the anterior part of the pelvis and makes pressure through the utero-vesical pouch and, of course, in the direction of the pouch of Douglas. The small intestine descends by gravity, as happens with any body that is dropped. The pouch of Douglas is accordingly emptied. If the tumour which is being forced backwards by the air entry effectively seals the pouch of Douglas, it will be jammed with great force towards the *cul-de-sac*. Theoretically it may require a force of up to 200 lb. to dislodge such a tumour. Fortunately it is easy to wedge the fingers between the tumour and the sacral promontory and allow air to enter. When William Hunter failed to dislodge the uterus in his case of incarcerated gravid uterus, vascular effects and oedema would have set in and must rapidly have increased the impaction. No doubt the injection of air into the *cul-de-sac* (from below if it is not possible from above) would have helped to deliver the uterus.

The board-like rigidity resulting from a perforated gastric ulcer must be due to the need to reduce peritoneal sliding which causes pain. A reflex would effect muscular spasm driving the diaphragm upwards into a fixed position, and only upper costal respiration would be possible.

The collection of gas in the intestine in subjects confined to bed for upwards of 12 hours is probably due to lowered abdominal pressure permitting some degree of dilatation of the gut. An adequately contracting gut reduces vaporization of the volatile contents and may



force gas so formed into solution in the blood. Post-operative distension is probably due to a failure of this process or to the sucking in of air. The latter is usually undetectable at the time. It is likely to occur during anaesthesia. It may be of value to pass a tube at the termination of the operation to let out all gastric air; then to apply firmly a many-tailed bandage to prevent laxity of the abdominal wall and consequent intestinal dilatation. If the patient shows distress because of excessive flatus, the binder will have to be removed. The possibility in this case is that air sucked in had advanced beyond the stomach. The higher the abdominal pressure, the more force would the gut have to exert in propelling its contents along. The flatus is more likely to advance distally if the abdomen is not compressed.

5. *Obstetrical Anatomy.* Trials of suction around the pelvic outlet proved successful. The subject sat on a decompression chamber with a suitable rubber seal. The levatores ani forming the pelvic diaphragm or floor of the abdominal cavity may be regarded as the partition above which the pressure is abdominal and just higher than atmospheric, and below which there is the lower pressure induced by decompression. There is at present no doubt that there is a pressure head between the contents of the abdomen and the birth canal below the levatores. Thus second stage expulsion of the foetus was accomplished without bearing down where decompression was applied during contractions, and actually shortened when accompanied by bearing down. Decompression appeared to facilitate descent of the head even where arrest had occurred above the brim. It may be that tension in the walls of a contracting uterus, lower segment, or even stretched upper vagina prevents the collapse which must occur in the vagina above the floor when empty. Experiment is necessary to discover whether during such collapse the reduced pressure region extends above the levator muscles.

Suction after separation of the placenta secured delivery in 20–30 seconds without any need to manipulate the abdomen. Hardness of the empty uterus was more pronounced than found in normal delivery. This is probably due to exsanguination of the uterus via the uterine veins that are subjected to the negative pressure inside the bony pelvis. Post-partum haemorrhage due to atony was treated satisfactorily by decompression and a firm uterus obtained.

The musculature *post partum* must be in a relatively flaccid condition, and its fortification by an efficient abdominal binder would

prevent the uterus from becoming atonic and increased in size. Women are comforted by the binder *post partum*, and its use appears to be rational. Blood is apt to cool in the large veins, perhaps because the small intestine subsides into the relaxed loins. In cats it has been found that, after a fall of blood pressure from an induced haemorrhage, a rise to normal has followed injection of sufficient fluid to raise the abdominal pressure.

## DISCUSSION

The phrase plastic tonus was applied by Sherrington to the state of certain muscles in decerebrate rigidity. Under normal conditions the inhibitory pathway from the cerebral cortex prevents this rigidity. The main reflex centre for decerebrate tonus is in the midbrain, and decerebration increases its excitability so much that slight peripheral stimuli maintain certain groups of muscles in a state of reflex tonic contraction. Thus the contracted limb extensors can be flexed to any degree and remain fixed in this position. It was this state that Sherrington called plastic tonus.

The expression is convenient for describing the behaviour of the muscular abdominal wall, even if it does not refer specifically to Sherrington's definition. Invariably in the living state there is tone in the abdominal musculature. Its behaviour is unusual in so far as it stretches and contracts to accommodate the ever varying abdominal contents. Two elementary properties may be recalled:

(1) Ingestion of substantial alimentary matter leads to stretching, but the muscles are soon in equilibrium or in relative rest. The feeling of fullness after feasting disappears as the fibres resume a state of normal tension at their new and increased length. The same situation prevails with exaggerated respiratory activity.

(2) The rapidity of abdominal muscle activity can be similar to that of average skeletal muscle as evidenced by palpating the contractions of the former during rapid trunk movements. With the slower stretch following diaphragmatic descent on ingestion, abdominal muscle function is reminiscent of the slow contractile rate of smooth muscle. The question arises whether artificial stretching of the abdominal wall early in labour would allow of enhanced relaxation for several hours thereafter. The rapidity of action referred to may be due entirely to the rectus, which could counteract much of the elongation induced in the flat muscles.

Schafer in 1900 suggested that the abdominal wall movement of respiration was under the influence of the respiratory centre. Though difficult to prove, this seems to be sound. It accords with the possibility that the flat muscles are largely involuntary and postural.

#### EQUIPMENT AND METHOD

The equipment for the first stage of labour (Figs. 1-3) comprises 4 components. These are the chair, the pump, the plastic air-tight suit and the incompressible spacer made of fibre glass.

The chair is unusually comfortable and allows the patient to sit in a nearly semi-reclining position. X-ray studies have shown that the long axis of the foetus in this position is vertical with small variations.

The pump required is a roughing type with a capacity of 70 litres per minute. It is not expensive. Smaller and larger pumps have been used, but it seems as if the type favoured by us will prove to be the most suitable.

The plastic suit used by us at present has

a gauge of 8/1000ths of an inch. We have also used a thickness of 4/1000ths, but the material is apt to tear. Sealing is not equally satisfactory with 12/1000ths of an inch, nor is the very thick Nylon impregnated with polyvinyl chloride so suitable for general use. As it is necessary to open the suit, there is a 4-foot zip fastener running up the front of the suit. This is a plastic zip which is completely air-tight.

The spacer has been made of fibre glass and is adjustable by means of a sliding shoe located at the angle which fits into the sitting angle of the chair. The spacer or cage must reach to somewhere about midway between the upper border of the breast and the axilla. It is necessary that the lower thorax be decompressed. In most cases the cage covers the vulva. The perfection of the cage has been very troublesome, but it is possible that one size with the adjustable shoe may serve almost all cases. A big antenatal clinic has been indispensable to our fitting of the apparatus, as there is such a wide range of different sizes required.



Fig. 1. The equipment in use at the time when the series was done.

It would be ideal to postpone decompression during labour until the patient is in irrevocable labour. Unfortunately, the women in spurious labour very frequently complain about their suffering, and there is no doubt that decompression gives relief. In effect, therefore, any women who are likely to be in labour and also those who are well advanced in the first stage should be regarded as candidates for decompression.

The bag is laid open on the chair and the patient steps into it. The spacer is then placed in position over the abdomen and lower thorax and the zip is slid up to the upper thoracic part of the suit. This part of the suit has to fit snugly in order to effect sealing. It has been found necessary to have different sizes of suits in respect of this uppermost part. Gradations from 28–38 inches in girth with 2-inch intervals have been used.

The patient is now shown what effect decompression of the abdomen and lower chest has on her breathing. From about 40 mm. Hg below atmospheric pressure the diaphragm becomes immobilized in its lowermost position. This is not very unpleasant, but it de-

mands some mental adjustment. When the patient is having painful contractions, she appreciates from the outset that there is relief of pain. She is, therefore, an apt pupil. If she is in strong labour, she learns to control the decompression herself within 3 or 4 or 5 contractions. She is quite happy to remain in the chair for several hours. The experience of having a few contractions without decompression usually leads her to request decompression without cessation. The suit is easily opened and the cage removed for listening to the foetal heart. It may be emphasized that there is very little inclination for the parturient to leave the chair in order to walk about, lie on the bed, or even to wander off aimlessly to the toilet.

The patient starts decompression as soon as she becomes aware of the onset of a contraction. Decompression tends to increase the length of the contraction, and apparently also its strength. Nevertheless, the patient suffers very much less with its use. Varying technique has not been exploited to any great extent, and control of decompression has been left to the patient for the most part. How-

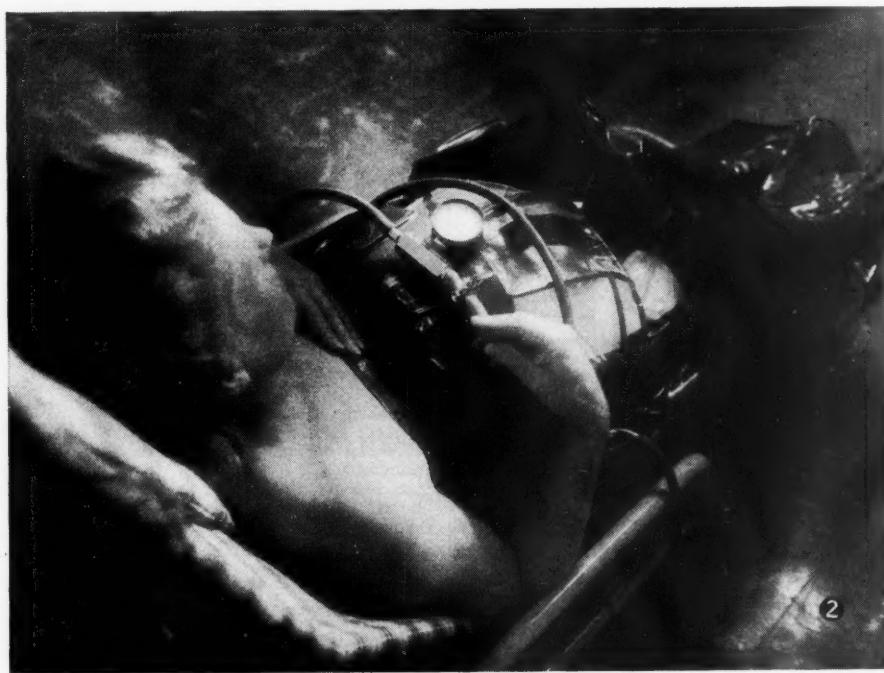


Fig. 2. Decompression in progress.

ever, the level used is normally 40–50 mm. Hg during contractions, but some patients are quite happy about dropping this to 100 mm. Hg, and sometimes even lower. The subject

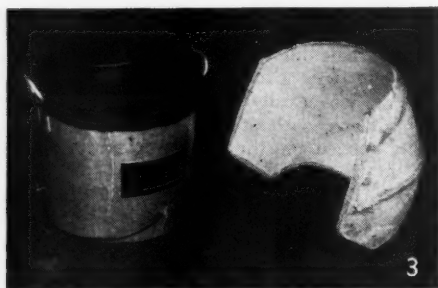


Fig. 3. Prototypes. The original third stage decompression chamber and a fibre glass cage.

likes to avoid raising the pressure above 20 mm. between pains. Much depends on the relief of pain gained by the patient, but also upon temperament and the robustness of the subject. There is no doubt that beyond 100

mm. Hg only upper costal breathing is possible, and a certain fortitude is required. In the laboratory some of us have withstood a pressure drop of 200, 250 and even 300 mm. Hg.

As the patient is delivered out of the suit in a routine fashion, ordinary clinical judgment is required to decide when the cervix is nearly fully dilated. This is as straightforward as in a labour which is conducted on orthodox lines. When the os becomes fully dilated within 1, 2 or 3 hours, surprise on the part of the attendant is usually experienced. In no case has foetal distress been found to develop during decompression. Late rupture of the membranes seems to be characteristic, and it is probable that intra-amniotic pressure is reduced during decompression.

#### CASE REPORTS AND PSYCHOLOGICAL RESPONSE

The following case reports (Table 1) have been selected to show certain aspects of decompression at its best. The notes are those taken during parturition in each case.

TABLE 1

Miscellaneous	Decompression Date and Time	Remarks
1. Mrs. S. P. Age: 24 years. Parity: 0. Height: 5' 6". Expected Date of Delivery: 22 December 1958 Reg. No.: 5516.	2 December 1958  Decompression begun 1 p.m.  Decompression ended 1.45 p.m. Decompression begun 2 p.m. 2.25 p.m. Decompression ended 3.20 p.m.	In labour since 1 a.m. Irregular contractions every 5 minutes, short, and backache ++. O.E. R.O.P. Head not engaged but can be pushed into the pelvis. Foetal heart satisfactory. P.R. Cervix thick, 1 finger, sacral os. Good patient—takes pressure to 100 mm. at times. All backache relieved. Labour definitely stimulated. Pains every 2 minutes and lasting much longer. Analgesia 60%. 1.50 p.m.: Foetal heart satisfactory. She wants to go back in the suit.  Suit leaking—adjusted. 3.40 p.m.: P.R. fully dilated. Removed to labour ward. Delivered at 4.20 p.m. of a 9 lb. 8 oz. infant. Analgesia 60%. From 1 finger, thick cervix to full dilatation in 2.40 hours. Decompression time 2 hours 20 minutes. A most enthusiastic patient.
2. Mrs. M. T. Age: 21 years. Parity: 0. Height: 5' 3". Expected Date of Delivery: 2 December 1958 Reg. No.: 5499.	1 December 1958  Decompression begun 3.10 p.m.  3.40 p.m.	In labour since 2.15 a.m. Patient extremely distressed. In good labour. Backache +++. O.E. R.O.A. Head not engaged. Pains every 2-3 minutes lasting 40 seconds. P.R. 1+ finger dilated, soft cervix, not well taken up. Vertex. Head 0.5 cm. above level of I.S. Marked relief of backache. Decompressed from 25 to 50 mm. Hg.

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1. Maynert, E. W. and Losin, L.: J. Pharmacol. & Exper. Therap. 115:275-282 (Nov.) 1955.

2. Butler, T. C. et al.: J. Pharmacol. & Exper. Therap. 111:425 (Aug.) 1954.

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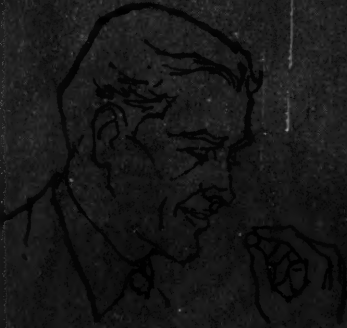




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TABLE 1 (Continued)

<i>Miscellaneous</i>	<i>Decompression Date and Time</i>	<i>Remarks</i>
	Decompression 4 p.m. ended	Contractions strong and regular at 2-3 minute intervals. Patient wishes to bear down. Decompression stopped. Removed to labour ward. Fully dilated 4.40 p.m. Delivered 5.10 p.m. of a 7 lb. 14 oz. infant. From 1+ finger to full dilatation in 50-60 minutes. Estimates analgesia at 50%. She says pain was much worse when she came out. Enthusiastic. Stage II, 1 hour. Decompression time, 50-60 minutes.
3. Mrs. M. C. Age: 22 years. Parity: 0. Height: 5' 3½". Expected Date of Delivery: 25 August 1958 Reg. No.: 1313, 3878.	25 August 1958 Decompression 9.15 a.m. begun	Labour started: contractions 1 a.m., show 3.30 a.m. O.E. L.O.A. Head engaged. Fair contractions every 5 minutes. P.R. 1+ finger, thin cervix. Vertex at I.S. Decompression 50/20. Immense relief. Full of praise—best I've heard so far. Fully dilated on rectal examination. P.V. Thin rim still present. Fully dilated 12.45 p.m. Delivered 1.30 p.m. of a 6 lb. 14 oz. infant—cried well. Normal stage III. Episiotomy. Excellent result. From 1 finger to full dilatation in 3½ hours. Decompression time 2½ hours. Excellent analgesia—80%. Very enthusiastic.
	Decompression 11.45 a.m. ended	
4. Mrs. C. D. Age: 38 years. Parity: 0. Height: 5' 5". Expected Date of Delivery: 24 September 1958. Reg. No.: 1183, 4284.	17 September 1958	Membranes ruptured 10.20 p.m. 16 September 1958. Irregular contractions since then. Slight show this morning. 12 noon: L.O.A. Head engaged. P.R. 11.45 a.m. 1+ finger, thick cervix, poorly applied.
	Decompression 12 noon. begun	Decompression -80 mm. Hg. Tremendous relief, 80%. Difficulty with zip + + 38". Labour stimulated +.
	Decompression 2 p.m. ended	P.R. 3 fingers, thinner. Powerful labour—Pethidine 100 mg. at 1.30 p.m. Wants to bear down. A thin rim of cervix left. Fully dilated, 4 p.m.
	Decompression 2.30 p.m. begun	Delivered 4.37 p.m. of 8 lb. 7½ oz. baby. Excellent result: from 1 finger, thick cervix to full dilatation in 4 hours—in an elderly primipara. Excellent analgesia, 80%.
	Decompression 3.5 p.m. ended	Note high pressures. Baby well. Normal 3rd stage; 2nd degree tear. Decompression time, 2½ hours.
5. Mrs. A. J. Age: 15 years Parity: 0. Height: 5' 1". Expected Date of Delivery: 15 September 1958. Reg. No.: 2270, 4095.	6 September 1958	Niggling pains for 2 days; 5-minute contractions since 6 a.m. No show. Membranes intact. Thought to be in early labour. P.R. Very thin cervix, os closed—rim not palpable. Pressure -40 mm. Hg. Immense relief of backache and front pain—70%. Excellent patient.
	Decompression 11.5 a.m. begun	2nd staging. Delivered 1.12 p.m. of 7 lb. 1¼ oz. infant, well. Normal 3rd stage; 2nd degree tear. Excellent result: From 1 finger paper thin cervix to full dilatation in 1 hour 40 minutes. 70% analgesia. Labour stimulated markedly. Very good, co-operative patient. Decompression time 1 hour 40 minutes.
	Decompression 12.50 p.m. ended	

TABLE 1 (Continued)

<i>Miscellaneous</i>	<i>Decompression Date and Time</i>	<i>Remarks</i>
6. Mrs. A. C. Age: 20 years. Parity: 0. Height: 5' 7". Expected Date of Delivery: 7 September 1958. Reg. No.: 423 N, 4132.	8 September 1958  Decompression begun 11.50 a.m. Decompression ended 3 p.m.  Decompression begun 3.30 p.m. Decompression ended 4.45 p.m.	Labour commenced at 4 a.m. 11.45 a.m. Cervix 2 fingers (Dr. Meyer). L.O.T. Engaged. Pressure -50 mm. Hg. 1.10 p.m. 100% relief of pain—front and back. P.R. 3 fingers. Fully dilated at 4.45 p.m. Delivered of 6 lb. 14 oz. infant at 5.20 p.m. Baby well. Normal 3rd stage. Slept during 2nd stage! Excellent result: From 2 fingers to full dilatation in 4 hours 55 minutes. 100% analgesia. Slept during 2nd stage!
7. Mrs. M. N. Age: 17 years. Parity: 0. Height: 5' 6". Expected Date of Delivery: 7 September 1958. Reg. No.: 1343, 4150.	10 September 1958  Decompression begun 7.30 p.m.  Decompression ended 9.30 p.m.	Moderately severe pre-eclamptic toxæmia. Blood pressure: 150/90 mm. Hg in the last 3 weeks. Admitted 4 times. Medical induction on 10 September 1958. Vague contractions since 3 p.m. 7 p.m. R.O.A. Engaged. P.R. Cervix thin, 1 finger, well applied. Vertex at I.S. level. Pressure -50 to -80 mm. Hg. Hardly in labour. Used in demonstration to S.A.S.O.G. Obstetrics Group. Excellent relief, 80%, of backache. Removed from S.A.S.O.G. meeting. 10.15 p.m. Fully dilated. Delivered of a 6 lb. 14½ oz. infant at 10.30 p.m. Baby well. Normal 3rd stage. Excellent result: 80% analgesia. Patient most unhappy when moved out of lecture theatre—out of decompression. From 1 finger to full dilatation in 3 hours. Decompression time 2 hours. Very enthusiastic patient.

As there are two main effects on labour, an assessment of their relative value and importance is called for. So far as the parturient is concerned, relief of pain is much more important than reduction of the duration of the first stage. Almost without exception the parturient, when questioned, says unhesitatingly that she would rather have 6 or 7 hours of the first stage with marked relief than 2 to 3 hours with a substantial element of pain. The research interest is obviously in reduction of labour time and an urge to discover why some parturients are quick and others slow. It has been noticed that a very short labour (within 3 hours) gives the effect of violence. Many of these patients definitely suffer pain, although they are relieved as compared with non-decompression contractions. Sometimes they are not quite as fresh for the second stage as parturients who have had an easier experience with decompression.

During the experimental phase only primigravidae in very early labour were decompressed. Later a parallel series was conducted in which multiparae and women with the os dilated 3 fingers or even more were allowed decompression. These cases illustrate best of all the degree of relief experienced. It is touching to hear what these patients say within 5 minutes of the start of decompression. One primigravida with half dilatation of the os and suffering much pain said after the third contraction: 'Even men can have babies this way.' 'This is the most wonderful thing in the world.'

Others have made the following remarks: 'If you are in labour and you don't feel as if you're in labour, then it's something, man.' 'Decompression seems to take the pain for me.'

'This helps so much I get flummoxed,' and she recognized the onset of pain with difficulty.

'I like the way my back is gripped by the decompression—like having your back rubbed.'

mix with them on the floor asking questions, and a good impression has thus far been made.

## DEMONSTRATIONS

In association with the antenatal clinic, classes were held 5 days per week. Decompression was explained to each group of about 15 expectant women, questions answered, and a pregnant woman actually given decompression. If a parturient was available in the hospital, she was given decompression and the class taken along to see for themselves. The psychological effect was profound. Here the primigravida with her inevitable fears would for the first time see a woman in labour, and the equanimity of the latter would impress her deeply. Class members would ask questions of the parturient while standing around her, and there would follow a to and fro discussion. These women really felt that they wanted decompression when they came into labour, and this urge was revealed even by multiparae before, during and after labour.

Successful demonstrations have been given to large groups of workers in obstetrics. Thus obstetricians, general practitioners, medical officers of health, midwives and other nurses have had group demonstrations. Many practitioners from here and abroad have come individually to see cases decompressed. At the major demonstrations a particular feature has been the presence of those puerperal women in hospital who had been decompressed during labour. The audience would

## NOTES ON TABLE 2

1. 100 primigravidae are analysed and (shown in brackets) 12 multiparae.

(a) In 78 cases decompression was started at 0-1 finger dilatation.

(b) In 22 cases decompression was started at 2-finger dilatation.

(c) In no cases was decompression started at more than 2-finger dilatation.

2. Sometimes decompression was stopped with a rim of cervix present. This frequently took a long time to disappear but the time up to unequivocal full dilatation was the one counted.

3. There were 2 caesarean sections not shown under Stage II.

NOTE ON THE FOUR STAGE I FAILURES  
(I.E. OVER 20 HOURS)

In 3 cases the pain relief was 70% and in the fourth, 50%. The first had decompression for 10 hours and in some respects was not a failure. Two had decompression for just over 7 hours, one having contractions only during such treatment, the other having been in labour for 36 hours previously. The fourth was decompressed (for 5 hours) by request because inductions for postmaturity had failed.

The patients in Table 3 were all White women. In our service 2.4 per thousand spontaneous first labours had an unequivocal duration of under 5 hours for their first stage.

TABLE 2:

DURATION OF LABOUR STAGES FROM START OF DECOMPRESSION (100 PRIMIGRAVIDAE).

Time in Hours	Stage I (Number)	Stages I and II. (Number)	Time in Minutes for the Groups Shown in Column 2		Remarks
			Stage II (Average)	Stage II (Range)	
1—	7	4	27	5—47	
2—	15 (5)	9	34	20—75	
3—	9 (3)	15	29	5—60	
4—	19 (3)	11	31	10—75	
5—	14 (1)	22	25	10—60	
6—	8	7	43	10—95	
7—	0	3	48	20—67	3 occipito-posterior
8—	6	2			
9—10	6	5			
10+—20	12	15	46	20—80	5 occipito-posterior
over 20	4	5	33	19—50	4 occipito-posterior
	100	98	35.0	5—95	



TABLE 3: RELIEF OF PAIN (100 PRIMIGRAVIDAE)

Percentage Relief Estimated by Patient	Primiparae	Duration of First Stage in 9 Individuals having less than 30% Relief	
		Hours	Minutes
100	2	1	0
90	3	1	10
80	5	2	40
70	31	2	50
60	11	3	35
50	25	4	0
40	9	6	0
30	5	8	50
		19	45
	91	9	

The figures for August, September and October show an improvement on the rest, e.g. 72% delivered in under 5 hours. This is due to improved apparatus, and a rigid abdominal cage according to our requirements has only recently been in use. An attempt to estimate the failure rate of the method must take into account (a) the short duration of the first stage, and (b) the relief of pain. The parturients are very much more interested in the latter and one has gained the impression that they tend to lose a sense of time. The Tables raise the question whether all women did not benefit in one way or another, and careful consideration of individual disappointing results of either (a) or (b) above resulted in a firm conclusion that no case could be regarded as a failure.

#### APPENDIX

The significance of change of shape of the uterus during contraction has been referred to, but not in detail. At rest the upper segment is ellipsoid rather than spherical, with the long axis supero-inferior, the transverse axis sometimes next in size, and the antero-posterior certainly shortened by abdominal wall pressure. It is a matter of simple observation that the antero-posterior axis increases during a contraction, the transverse showing its lengthening by bulging of the loins. Expansion of the lower rib cage, as in inspiration, would provide considerable space for both diameters in the uppermost fundal part of the uterus. While shortening of the long axis must occur

sooner or later during uterine activity, the length of this axis will depend on where its lower limit is considered to be. However, the contraction results in an upper uterus which, if not spherical, would have an eccentricity nearer to 1 than that of the flaccid ellipsoid.

In this case the volume of the sphere would be greater than that of the ellipsoid but, as the uterine content remains of constant volume, shortening of the myometrial wall is possible. Proof of the potential change in volume may be stated as follows, but thinning of the wall can also be demonstrated by flattening a toy balloon containing water.

Suppose the original radius of the sphere was  $x$ .

Then volume of sphere =  $\frac{4}{3}\pi x^3$ .

If the semi-axes of the ellipsoid are

$(x - a)$ ,  $(x - a)$ ,  $(x + a)$

the volume of ellipsoid =  $\frac{4}{3}\pi (x + a)(x - a)^2$ .

Now we wish to show that the volume of the ellipsoid is less than the volume of the sphere. This will be so if:

$$\frac{4}{3}\pi [x^3 - (x + a)(x - a)^2] > 0$$

$$\text{i.e. if } ax^2 + a^2x - a^3 > 0.$$

Now roots of this function are:

$$x = -a/2(1 + \sqrt{5}) \text{ and } -a/2(1 - \sqrt{5}).$$

Since the function has the same sign as the coefficient of  $x^3$  except when  $x$  lies between the roots, the inequality does not hold for:

$$-a/2(1 + \sqrt{5}) < x < a/2(\sqrt{5} - 1).$$

Neglecting negative values of  $x$  we have that the inequality holds for:

$$x > a/2(\sqrt{5} - 1)$$

$$\text{i.e. } a < \frac{2x}{\sqrt{5} - 1}.$$

$\therefore$  For all  $a < x$  the ellipsoid has a smaller volume than the sphere.

The conclusion is accordingly that, with change of shape of the uterus during contraction, isotonic contraction (real shortening) is possible. On the other hand, with no change of shape isometric contraction occurs with no resultant shortening. The idea is elementary but fundamental to an explanation of how shortening and thickening of the myometrium of the upper segment take place. Any arc in the perimeter that changes shape may shorten but, if it is located in the fundus, it will either lengthen subsequently when the uterus becomes flattened or overcome and stretch a length of lower segment proportional to the degree of shortening that persists. It is further possible that isometric contraction will raise intra-amniotic pressure without promoting dilatation and obliteration of the cervix; it certainly

will not effect the requisite rearrangement of myometrium in upper and lower segments. What is even more significant is that the sliding together of muscle elements in isotonic contraction with shortening may take place almost without a rise in intra-amniotic pressure, and in these circumstances is accompanied by less pain, possibly the backache moiety.

Acknowledgements are due to Dr. E. C. Halliday (of the Council for Scientific and Industrial Research) who has always been available to me for scientific advice; to Dr. J. C. Nicholson, our Anaesthetics Chief, and his senior staff members, the late Dr. D. C. Devitt, and Dr. Kathleen Vetten, all of whom administered Scoline and anaesthesia to our cases; and to the Assistant Surgeon-General (Air) of the Central Medical Establishment, South African Air Force, for extending certain facilities under his control.

## THE VALUE OF ERYTHROMYCIN

JULIUS BUCH, M.B., B.Ch., M.R.C.P. (Ed.)

Johannesburg

Erythromycin possesses features which make it ideal for general usage. The safety factor of this antibiotic is of immense value for, as will be indicated, the danger of any serious side reactions or sequelae are nil. This, together with the fact that it successfully combats the vast majority of infections encountered in medical practice, would presuppose that it would be prescribed on a large scale. This, however, is not the case in South Africa or Rhodesia.

The main reason why this antibiotic is not widely used in Southern Africa is that twofold misconceptions regarding its properties still persist in the minds of many practitioners. Firstly, it is still firmly believed that organisms, particularly the staphylococci, develop a markedly rapid resistance to erythromycin; thus it is considered that it should only be used when other antibiotics fail, and that it should be kept in hand and used sparingly in order not to reduce its potency. The other misconception is that erythromycin is regarded as a narrow-spectrum antibiotic.

At the outset it should be made clear that organisms develop resistance to *all* antibiotics but, in point of fact, it appears that the percentage of organisms sensitive to other antibiotics has declined more than is the case with erythromycin.

Weil<sup>1</sup> tested the sensitivity of microorganisms to a range of antibiotics, comparing the results with those of a similar test carried out in 1953-1954. For streptococci the percentage of organisms sensitive to penicillin rose (from 1954-1958) from 50% to 55%. For erythromycin the percentage fell from 94% to 80%, and for the tetracycline group the percentage fell from 76% to 43%.

For staphylococci the percentage sensitive to penicillin fell from 32% to 24%. The per-

centage sensitive to erythromycin fell from 99% to 83%. The percentage sensitive to the tetracycline group fell from 69% to 45%. These figures indicate that there is a higher percentage of sensitivity to erythromycin and that the percentage has declined very little, the decline being greater in the other antibiotics tested.

A recent South African investigation by Bubb<sup>2</sup> indicated that in his laboratory the highest resistance of *S. aureus* was to penicillin. Erythromycin and novobiocin were the most sensitive.

While it is true that organisms do develop resistance to antibiotics in hospitals, this does not occur to anything like the same degree in out-patient or general practice. The close contact conditions of a hospital favour the development of resistance by organisms. Griffith *et al.*,<sup>3</sup> in their study entitled *Biological and Antibiotic Sensitivity Studies on 'Street Staphylococci'* state

'there was no evidence that a reservoir of antibiotic-resistant staphylococci has developed in the general population. The majority of staphylococci in out-patients appear to be sensitive to antibiotic therapy.'

Further they state:

'Erythromycin was more effective against a greater number of coagulase-positive strains of staphylococci than against any of the other antibiotics tested.'

Thus it is obvious that the fixed conception that microorganisms lose their sensitivity to a greater degree than to other antibiotics is certainly not factual. Even more important is the observation that in general practice erythromycin appears to be strongly effective against staphylococci, and that there is no evidence to indicate that it is losing its potency.

Withholding erythromycin so that it may be used for emergency purposes is certainly without good reason, particularly as there are always available other antibiotics such as novobiocin, vancomycin, ristocetin, which have all been shown to be highly effective against staphylococci.

The second great misconception is that erythromycin is a narrow-spectrum antibiotic. It has, in fact, a very wide range. It is, however, insensitive to gram-negative organisms and it is this factor which to a large degree determines its value as a safe antibiotic.

Its microbial sensitivity includes the following organisms:

*Micrococcus pyogenes*; *Micrococcus pyogenes* var. *aureus*; *Streptococcus pyogenes*; *Streptococcus faecalis*; *Streptococcus mitis*; *Streptococcus sanguis*; *Diplococcus pneumoniae*; *Neisseria gonorrhoeae*; *Neisseria meningitidis*; *Corynebacterium diphtheriae*; *Clostridium perfringens*; *Clostridium tetani*; *Haemophilus pertussis*; *Haemophilus influenzae*.

It is interesting to note the findings of Batterman *et al.*<sup>4</sup> in their study on the responsiveness of commonly encountered respiratory infections to the oral administration of erythromycin. They found that in 39 ambulatory and 73 hospitalized patients treated without bacteriological examination, erythromycin was found to control completely the infection in 79.5% and 83.5% of cases respectively. In a group of 32 patients followed with bacterial examinations, control of the infection was achieved in 85% of the patients. They conclude that erythromycin is an effective and safe antibiotic for the treatment of a wide variety of commonly encountered respiratory infections, regardless of etiologic pathogenic microorganisms. When it is realized that respiratory infections, which comprise the most commonly encountered infections in general practice, can be controlled by erythromycin in about 80–85% of cases, its value as an antibiotic for general use becomes apparent; and when it is further realized that 85% of bacterial infections (excluding tuberculosis) encountered in normal practice are caused by staphylococci, streptococci and pneumococci (which are all usually highly sensitive to erythromycin) it must become apparent that it can be classed as a broad-spectrum antibiotic.

Perhaps the greatest value is that it can be used on a wide scale without the fear of any of the major side effects so commonly encountered with other antibiotics. This is well substantiated by the work of Welch *et al.*,<sup>5</sup> who report on severe reactions to antibiotics. This report is based on a nation-wide survey which

was designed to include a total of 800 hospitals and interviews with more than 1,600 physicians in the U.S.A.

They classified 1,070 reactions as severe; of these, more than 800 were of the anaphylactoid type. Super-infections, severe skin reactions, blood dyscrasias and angioneurotic oedema with respiratory involvement, comprised the remainder. Of the 809 anaphylactoid reactions, 793 were the result of the administration of penicillin preparations.

Twelve cases were the result of intramuscular injections of streptomycin or dihydrostreptomycin. One was associated with capsules of chloramphenicol and one with capsules of tetracycline, while another followed an intramuscular injection of tetracycline administered with testosterone in oil.

There were 611 anaphylactoid reactions following intramuscular injection, with 63 deaths. There were 122 anaphylactoid reactions that followed intramuscular injection of penicillin in combination with streptomycin or dihydrostreptomycin. Nine of these were fatal. Thus the total deaths were 10%; 49 anaphylactoid reactions followed the use of oral penicillin. None of these was fatal.

They concluded in their survey that penicillin was found to produce the greatest number of severe reactions of all the antibiotics available. The tetracycline group accounted for most of the cases of severe super-infections. The mortality rate in staphylococcal enterocolitis super-infections was 34%. The cases of enterocolitis in which no cultures were obtained also showed a high rate of occurrence following abdominal operation (60%), with a fatality rate of 52%.

The blood dyscrasias reported were most frequently associated with the use of chloramphenicol. They conclude that

the tetracycline antibiotics should be used cautiously and judiciously, particularly in patients undergoing abdominal operation, and the possibility of staphylococcal enterocolitis must always be kept in mind when the drugs are used.

From this survey it was observed that erythromycin produced only one case that could be classified as a severe reaction. There were no deaths at all.

In a recent article Herrell<sup>6</sup> evaluates the hazards of antibiotic therapy as follows:

**Penicillin.** Though penicillin is relatively non-toxic, minor reactions are sometimes encountered. The most serious problems with the use of penicillin, however, are superimposed staphylococcal infections and anaphylactic reactions, the latter occurring most frequently after the intramuscular administration of procaine penicillin G. In a study of 793 cases of anaphylactic reactions to penicillin, the mortality was

found to be about 10%. It is suggested that certain principles of antibiotic therapy are sometimes violated in cases of fatal reactions.

*Streptomycin and Dihydrodesoxystreptomycin.* Streptomycin has been only rarely associated with the occurrence of major hazards, but several minor hazards may be encountered with its use. The most troublesome of these is contact dermatitis, and the most serious is toxicity for the eighth nerve, with a resultant impairment of hearing. The latter, while not fatal, is distressing to the patient.

Dihydrodesoxystreptomycin, in a study by the author and his colleagues, was found to produce less pain at the site of injection and fewer neurotoxic reactions, particularly damage to the eighth nerve.

*Tetracyclines.* Superimposed staphylococcal infection is, in Herrell's opinion, the most serious major hazard of antibiotic therapy in hospitals to-day. There is strong evidence to support the statement that the wide-spread and indiscriminate use of the tetracyclines is the chief factor involved. The two most serious superimposed staphylococcal infections are staphylococcal enterocolitis and severe wound infections with sepsis.

*Chloramphenicol.* There can be no mistake about the possibility of serious and fatal blood dyscrasia after the use of this antibiotic, alone or in combination with other antibiotics. The chance of successful treatment of blood dyscrasia is far less than that of anaphylactic reaction (10% mortality) and superimposed staphylococcal enterocolitis (40% mortality).

Children are particularly susceptible to blood dyscrasia after the administration of chloramphenicol. The case history of a 7-year-old girl treated with chloramphenicol for bronchopneumonia is given by Herrell *et al.* Approximately 7 weeks after treatment this patient died, with a diagnosis of aplastic anaemia.

*Erythromycin.* Herrell states: 'Erythromycin is an antibiotic that has been widely used. Minor hazards that have been encountered after its administration are drug rash (rare) and, on occasion, flatulence and diarrhoea (which usually occur when the dosage of erythromycin exceeds 300 mg. every 6 hours). Erythromycin is by far the least toxic of the commonly used antibiotics. I am unaware of any major or life-endangering hazard that has resulted from its use.'

*Miscellaneous Antibiotics.* Minor (i.e. not life-endangering) toxic effects are listed for neomycin, bacitracin, polymyxin, novobiocin, vancomycin, amphotericin B and ristocetin. Impairment of hearing, high fever, drug rash and severe phlebitis at the injection site has been reported following the use of vancomycin. 'Definite but transient leukopenia has been reported after ristocetin therapy.' This, however, has been observed in only 3% of the cases.

These two studies reveal that there is undisputed evidence that erythromycin is by far the least toxic of the commonly used antibiotics.

In so far as the minor side effects associated with antibiotics therapy is concerned, erythromycin has an additional advantage in that the usual complications such as avitaminosis, diarrhoea, vomiting, flatulence and pruritus are rarely encountered.

Erythromycin has been combined with stearic acid to form erythromycin stearate, and with propionic acid to form erythromycin propionate. These two preparations differ from the erythromycin base, in that they are more completely and rapidly absorbed. Their action is identical, and there is no significant difference in their blood levels. The action of erythromycin may be either bacteriostatic or bactericidal, depending on different circumstances.

Erythromycin has an additional advantage that, when circumstances occur not allowing oral therapy; it may be successfully administered by the intravenous or the intramuscular route.

#### SUMMARY

1. Organisms do not develop a more rapid resistance to erythromycin, as was previously believed. It appears, in fact, to be more sensitive than other commonly used antibiotics.
2. It has a wide range of activity and may be classified as a broad-spectrum antibiotic.
3. It is the safest antibiotic, being singularly free of minor or major hazards. Its inactivity against the gram-negative organisms is probably mainly responsible for its safety factor.
4. Its action may be bacteriostatic or bactericidal.

#### OPSOMMING

1. Organismes ontwikkel nie 'n vinniger weerstand teen eritromisien, soos vroeër gemeen is nie. Trouens, dit skyn asof eritromisien meer gevoelig is as die ander antibiotica wat gewoonlik gebruik word.
2. Dit het 'n uitgestrekte aktiwiteitsbestek en kan as 'n breëspektrum-antibiotikum geklassifiseer word.
3. Dit is die veiligste antibiotikum, want die gebruik daarvan bring opvallend minder klein en groot gevare mee. Dié veiligheidsfaktor moet waarskynlik hoofsaaklik toegeskryf word aan die middel se inaktiviteit teen Gram-negatiewe organismes.
4. Die effek daarvan kan bakteriostaties of bakterievernietigend wees.

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## NOTES AND NEWS : BERIGTE

Dr. David Friedberg, M.B., B.Ch. (Rand), M.R.C.O.G., F.C.O.G. (S.A.), has commenced practice as a Specialist Obstetrician and Gynaecologist at 113 Lister Buildings, Jeppe Street, Johannesburg. (Telephones:— Rooms: 22-8427; Residence: 40-5079).

Dr. F. Herbst, M.B., B.Ch., Dip. O. & G. (Rand), has joined Mr. J. Polonsky, F.R.C.S., M.R.C.O.G., in practice as an obstetrician and gynaecologist at 503 Lister Bldg., Jeppe St., Johannesburg. Telephones:—Rooms: 22-0385 or 22-4536; Residence: 41-2137.

Dr. Maurice Weinbren retired from his private radiotherapy practice in Johannesburg on 1 February 1959. He will, in future, confine himself to his work at the Chamber of Mines Hospital.

Dr. Max Shapiro has combined his practice with the radiotherapy practice of Dr. Henning who took over from Dr. Maurice Weinbren. They are continuing their practice at Lister Buildings, Princess Nursing Home and Vereeniging.

Mr. Aaron Kramer, M.P.S., has accepted an invitation to join the Board of South African Druggists Limited in a full-time capacity.

Mr. Kramer is an elected member of the South African Pharmacy Board and was Secretary of the Pharmaceutical Society (in an honorary capacity) for 10 years from its inception in 1946.

## MER-NATIONAL MEDICO-LEGAL FILMS

Three important medico-legal films have been introduced into South Africa by Mer-National Laboratories (Pty.) Ltd. These films have been made by the American Medical Association in conjunction with the American Bar Association.

The programme includes the preparation of six films dealing with forensic problems of medical practice.

The first three films are entitled:

*The Doctor Defendant;*

*The Medical Witness;*

*The Man who did not Walk;*

They are available on loan to Medical Practitioners and other interested groups.

Further information can be obtained from Mer-National Laboratories (Pty.) Ltd., P.O. Box 4551, Johannesburg.

## INSTITUTE OF PARASITOLOGY, DURBAN

At a ceremony in Durban on 15 January 1959, the foundation stones for the new Institute of Parasitology were laid by the Hon. Mr. D. G. Shepstone and Dr. S. M. Naude.

This marks another important step in the development of medical research in Natal, where the Institute is particularly favourably situated for the study of parasitic diseases.

This Institute has grown out of the work initiated by Dr. R. Elsdon-Dew, Director of the Amoebiasis Unit of the C.S.I.R.

The building of the new Institute is proceeding rapidly and it is expected that the new laboratories will be occupied in September or October this year.

## MEDICAL CONFERENCES IN 1959

- |   |                       |
|---|-----------------------|
| Congress of the International Anaesthesia Research Society—Miami, Florida ... ..                    | 20-23 April           |
| International Convention of the International Academy of Pathology—London ...                       | 20-25 April           |
| International Congress of Royal Society of Health—Harrogate ... ..                                  | 27 April-1 May        |
| International Convention of the American Goiter Association—Chicago ... ..                          | 30 April-2 May        |
| 4th International Congress of Public Health Education—Dusseldorf ... ..                             | 2-10 May              |
| International Congress of Infectious Diseases—Milan ...   | 6-10 May              |
| Congress of the International Hospital Federation—Edinburgh ... ..                                  | 1-6 June              |
| International Congress of Plastic Surgery—London ... ..   | 13-17 July            |
| International Congress of Paediatrics—Montreal ...  | 19-25 July            |
| International Exhibition and Congress of Radiology—Munich ... ..                                    | 23-30 July            |
| 21st International Congress of Psycho-Analysis—Copenhagen ... ..                                    | 25-31 July            |
| International Congress of the International Association of Logopedics and Phoniatrics—London ... .. | 17-22 August          |
| World Conference of Medical Education (World Medical Association)—Chicago ...                       | 30 August-4 September |
| International Convention of International Union of Biochemistry—Canberra ... ..                     | 31 August-4 September |
| International Congress on Cancer Cytology—Munich ...  | September             |
| 1st International Congress of Renal Physiopathology (Nephrology)—Geneva ...                         | 3-5 September         |
| World Confederation Congress of Physical Therapy—Paris ... ..                                       | 6-12 September        |
| General Assembly of the World Medical Association—Montreal ... ..                                   | 7-12 September        |
| Meeting of the International Dental Federation—New York ... ..                                      | 8-10 September        |
| 15th International Conference of Tuberculosis—Istanbul  | 11-18 September       |
| International Congress of the International Society of Surgery—Munich ... ..                        | 13-20 September       |
| International Meeting of the International League Against Rheumatism—Istanbul ...                   | 18-21 September       |
| 6th International Congress of Therapeutics—Strasbourg   | October               |
| International Convention of Neurological Surgeons—Miami, Florida ... ..                             | 29-31 October         |



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[D-4]

Dr. I. Orr, M.B., Ch.B., Dip. O. & G. (Rand), has recently returned from a post-graduate visit to London where he was successful in the M.R.C.O.G. examination.

He has resumed his practice as a Specialist Obstetrician and Gynaecologist at 506 Medical Arts Building, Jeppe Street, Johannesburg. (Telephones: Rooms: 22-0035; Residence: 44-5001).

MR. MICHAEL W. PERRIN, C.B.E., F.R.I.C.

Mr. Perrin (Chairman of the Wellcome Foundation) recently completed a tour of South Africa. He was born in Canada in 1905 when his father was there as Bishop of British Columbia. He was educated at Winchester College and won a scholarship to New College, Oxford, where he took his degree in chemistry. He then went to Toronto University with a grant from the National Research Council of Canada and carried out research work in physics for his M.A. degree.

In 1929 he joined Imperial Chemical Industries Limited and was launched into the special field which has been his main continuing interest, i.e. to build a bridge between the academic research worker and the recognition and practical application of his work. When he joined ICI, he was sent on a rather unusual assignment to Amsterdam University to study with Prof. A. Michels, who was then developing his specialized technique in the measurement of very high pressure and its significance in physics.

With the knowledge thus obtained after 4 years, Mr. Perrin was posted in 1933 to the Research Department of the Alkali Division of ICI, and here he played a leading part in starting a study of the chemical effects of high pressure and was, later, in charge of the group which discovered and developed the new plastic material now world-famous as Polythene. In other words, his academic research work had borne fruit in the field of commercial production and, incidentally, by making possible the practical development of radar played a vital part in winning the War.

In 1938, recognition of his particular knowledge and experience led to his being transferred to the Headquarters Research Department of ICI in London which, with the outbreak of war, was involved in the co-ordination of many special projects. Then in 1941 he was seconded to the British Government's Department of Scientific and Industrial Research as Assistant Director of Tube Alloys, the

cover name given to the British wartime atomic energy organization. In this capacity he was not engaged in active research himself but was able to interpret the ideas of the scientific workers to the industrialists, politicians and military men who were concerned in this all-important first development of the uses of atomic energy. This had also the effect of broadening his field of experience by contacts with Government officials, scientists and industrialists in the USA and Canada, where he paid several visits.

After the War ended, Mr. Perrin remained for 5 years as Deputy Controller (Technical Policy) in the Atomic Energy Division of the Ministry of Supply. For his services in connexion with atomic energy, Mr. Perrin was awarded the O.B.E. in 1946 and the C.B.E. in 1952.

Incidentally, during his time in the Directorate of Tube Alloys, he was involved in one of the dramatic stories of the War when Prof. Niels Bohr made his escape from occupied Denmark. Niels Bohr's knowledge and assistance were urgently needed by the Western Allies and it fell to Mr. Perrin to be largely responsible for winking him out of Denmark: a tricky operation involving a stealthy get-away, first in a rowing boat and then in a Mosquito aircraft and, afterwards the issue of a British passport to one 'Mr. Nicholas Baker' for his subsequent visits to the USA. Similarly, after the War, he took a leading part in the events which resulted in the trial and conviction of Klaus Fuchs.

But in 1951, Mr. Perrin left atomic energy and returned to ICI as Research Adviser to the company and his horizons were still further widened when he served as a representative of the Federation of British Industries on the International Mission set up by OEEC to study the organization of applied research in the countries of Western Europe.

In 1953 he was appointed Chairman of the Wellcome Foundation Ltd. and to-day is able to use his accumulated knowledge and experience in guiding the destinies of one of the largest and most distinguished firms in the British pharmaceutical industry.

In addition to his duties with The Wellcome Foundation, Mr. Perrin is Honorary Treasurer of the Chemical Society and of the Parliamentary and Scientific Committee. He is Chairman of the Institute of Cardiology in the Postgraduate Medical Federation of the University of London and a member of the Board of Governors of the National Heart Hospital, while his experience in the application of research has led to his appointment to the Board of Governors of the Chelsea College of Science and Technology, one of the recently recognized Colleges of Applied Technology in Britain.

## PREPARATIONS AND APPLIANCES

### EQUANITRATE

#### A MARKED ADVANCE IN PROPHYLAXIS OF ANGINA PECTORIS

Wyeth Laboratories (Pty.) Ltd. announce the introduction of a product which provides a new outlook for the angina patient.

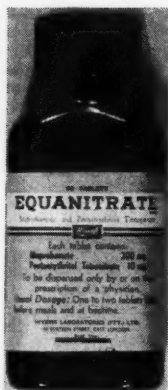
The product is a combination of Pentaerythritol Tetranitrate and Equanil (Meprobamate, Wyeth) marketed under the trade name of *Equanitrate*.

*Action:* *Equanitrate* provides effective coronary artery vasodilation and control of anxiety. Pentaerythritol tetranitrate is a notably active coronary vaso-

dilator which is closely related to glyceryl trinitrate yet it releases nitrate slowly for a prolonged period of time.

*Equanil* (Meprobamate, Wyeth) is a compound capable of relieving anxiety and tension. It has a selective action on the thalamus and is an effective skeletal muscle relaxant.

*Indications:* In patients with angina pectoris anxiety symptoms are often prominent. Therapy with *Equanitrate* provides better control of anginal pain than with either of these agents alone. Exercise-electrocardiographic tests have been found to revert more toward normal with *Equanitrate* than with either of the single agents.



*Equanitate* is useful for prophylaxis of pain in angina pectoris and coronary insufficiency. It has proven particularly useful in controlling the anxiety that often accompanies and increases the symptomatology of angina pectoris.

**Dosage:** Individualization of dosage is required for maximum therapeutic effect. One to two tablets before meals and at bedtime is the usual dose.

**Side Effects:** Side effects due to *Equanitate* are minimal and are limited to those produced by meprobamate and pentaerythritol tetranitrate.

Pentaerythritol tetranitrate may infrequently cause nausea and mild headache which usually disappear after 4 or 5 days of therapy. Drowsiness may occur particularly early in the course of meprobamate therapy but as a rule disappears as dosage is continued.

Side effects due to meprobamate are uncommon and usually become apparent after the first few doses. The only serious side effect is the rare occurrence of an allergic reaction, characterized by a pruritic urticarial or erythematous maculopapular rash, upon which the drug should be discontinued. Acute, non-thrombocytopenic purpura has also been reported.

**Contraindications:** Like all nitrates, *Equanitate* should be given with caution in glaucoma.

#### VALLERGAN

Maybaker (S.A.) (Pty.) Ltd. announce the introduction of *Vallergan* brand trimeprazine tartrate. Trimeprazine is a phenothiazine derivative pharmacologically intermediate between promethazine and chlorpromazine. Its antihistamine action is greater than that of promethazine, but its actions on the central nervous system resemble chlorpromazine. It has a stronger spasmolytic action but a weaker anti-adrenaline action than chlorpromazine.



*Vallergan* is indicated in the relief of pruritus in various dermatological conditions such as atopic dermatitis, neurodermatitis, chronic urticaria, and infantile eczema. Trimeprazine has also been found to be a useful oral pre-anæsthetic medication for children. They arrive at the anaesthetic room free from apprehension and induction is facilitated. After the anaesthetic they recover quickly with a minimum of restlessness and vomiting.

*Vallergan* is available as dark blue, sugar coated tablets of 10 mg. and as a syrup containing 2 mg./c.c. An increased strength trimeprazine tartrate syrup containing 6 mg./c.c., intended particularly for pre-anæsthetic medication for children, is available as *Vallergan Forte*.

#### KOLANTYL GEL AND TABLETS

##### 4-WAY TREATMENT FOR PEPTIC ULCER AND HYPERACIDITY

**Balanced Antacid Action.** The combination of fast-acting magnesium oxide and long-acting aluminium hydroxide provides almost immediate acid neutralization as well as prolonged antacid effects.

The balanced ratio of magnesium oxide (usually laxative) and aluminium hydroxide (usually constipative) eliminates bowel interference and does not produce alkalosis or acid rebound.

##### Superior Antispasmodic:

The distinctive antispasmodic ingredient — *Merbentyl* — effectively and promptly relieves spasm pain and hypermotility in two ways:

1. By directly relaxing smooth muscle.
2. By blocking impulses at parasympathetic nerve endings.

Because *Merbentyl's* antispasmodic action is selective to the gastrointestinal tract, undesirable belladonna-like side effects, such as dry mouth, blurred vision and urinary retention are avoided.

By slowing stomach-emptying time, the antacid medication is retained in the stomach longer.

##### Demulcent of Choice:

A superior demulcent methylcellulose (a 'synthetic mucin') forms a protective coating over the ulcerated mucosa of the stomach and duodenum, thus diminishing irritation of the lesions by acids and digestive enzymes. Further, this protective gel may be expected to hold the active ingredients in the ulcerated area.

Methylcellulose is not absorbed from the intestine, and does not interfere with absorption of fat soluble vitamins.

**Specific Anti-peptic:** The protective ingredient sodium lauryl sulphate has two beneficial actions in peptic ulcer patients:

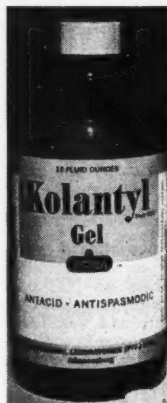
1. It lowers peptic activity of the gastric contents without changing pH.
2. It inactivates lysozyme, a mucolytic enzyme found in increased amounts in ulcerative disease.

This two-fold action encourages healing.

**Formula:** Each 10 c.c. of Gel or each Tablet of pleasant flavoured *Kolantyl* contains:

<i>Merbentyl</i> (dicyclomine hydrochloride) ...	5 mg.
Aluminium hydroxide gel, dried ...	400 mg.
Magnesium oxide, heavy ...	200 mg.
Methylcellulose ...	100 mg.
Sodium lauryl sulphate ...	25 mg.

**Dosage:** *Kolantyl Gel*—2 to 4 teaspoonfuls every 3 hours or as needed. May be taken undiluted or mixed with water or milk, half to one hour after food.





## PARENTROVITE IN GENERAL PRACTICE



Parentrovite, a high potency injectable preparation of the vitamin B complex with vitamin C, is being found of increasing usefulness in general practice. Introduced originally for the treatment of acute psychiatric emergencies such as coma or delirium from alcohol or drug overdosage, it has since been found to be of much wider application for conditions not uncommonly met in patients being nursed in their own homes. Many a patient can now, with appropriate dosage, be kept at home instead of having to be admitted to a general or a mental hospital.

The formula is based on the fact that normal cerebral function depends on the oxidation of glucose and that any interference with the underlying biochemical mechanisms can cause symptoms of mental disturbance. Severe infections, burns, trauma, surgical operations, and "stresses" of all kinds can be as potent as drugs and alcohol in causing interference with the enzyme systems responsible for glucose oxidation and resultant failure of return to health.

To reverse such changes and to restore normal cerebral function, massive doses of the B vitamins and ascorbic acid are needed — doses out of all proportion to normal nutritional needs. The vitamins are used here not as nutrients but as potent drugs employed pharmacologically.

### Conditions Reported Responsive to Parentrovite

The after-effects of influenza, pneumonia and other severe infections,  
Post-operative depression and confusion,  
Debility with loss of memory in old people,  
Alcoholism, acute and chronic,  
Habituation to barbiturates.

## Parentrovite

**PACKS:** In boxes of 3 and 12 pairs.  
Hospital pack also available.

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**Kolantyl Tablets**—2 tablets, chewed, every 3 hours, half to one hour after food.

*Supplied:* Kolantyl Gel—12 oz. bottles.

*Kolantyl Tablets*—bottles of 50 and 250.

*Manufactured:* Under the control of the Wm. S. Merrell Company, Cincinnati, U.S.A.

*Marketed in South Africa by:* Mer-National Laboratories (Pty.) Ltd., P.O. Box 6742, Johannesburg.

*Distributed by:* Westdene Products (Pty.) Limited, P.O. Box 7710, Johannesburg.

### DEBENDOX

#### FOR NAUSEA AND VOMITING OF PREGNANCY

*Debendox* has been reported highly effective for the symptomatic relief of morning sickness. It combines three safe anti-emetic drugs each with a specific mechanism of action:

**Antispasmodic:** *Merbentyl* for fast, effective relaxation of smooth muscle spasm and to relieve vomiting. The anti-emetic effect is due to the blocking of vagal impulses to the medullary vomiting centre. *Merbentyl* provides prompt relief of gastrointestinal upset without belladonna-like side effects.

**Antinauseant:** *Decapryn* for symptomatic control of nausea. Used alone, it has proved highly effective in relieving nausea following irradiation therapy.

**Nutritional Supplement:** *Pyridoxine* for overcoming the relative pyridoxine deficiency present in many cases of nausea and vomiting of pregnancy. Its role in the treatment of morning sickness is well established.



**Timed - Release Coating:** Each *Debendox* tablet has a special coating which triggers the anti-emetic action to take effect when it is needed most—upon awakening.

When two *Debendox* tablets are taken at bedtime (11 p.m.) the release of the medication is delayed for 4-6 hours (3 a.m.). When the patient awakens (7 a.m.) the ingredients are fully active to

provide protection against nausea.

**Formula:** Each specially coated tablet of *Debendox* contains:

*Merbentyl* (dicyclomine hydrochloride) 10 mg.  
*Decapryn* (doxylamine succinate) ... 10 mg.  
 Pyridoxine hydrochloride ... 10 mg.

**Dosage:** 2 tablets at bedtime. In severe nausea, symptomatic relief may be obtained by administering one additional tablet of *Debendox* on arising and repeating mid-afternoon.

*Supplied:* Bottles of 30 tablets.

*Manufactured:* Under the control of the Wm. S. Merrell Company, Cincinnati, U.S.A.

*Marketed in South Africa by:* Mer-National Laboratories (Pty.) Ltd., P.O. Box 6742, Johannesburg.

*Distributed by:* Westdene Products (Pty.) Limited, P.O. Box 7710, Johannesburg.

### PARENZYME

#### FOR INFLAMMATORY DISORDERS

*Parenzyme* is a highly purified form of the proteolytic enzyme trypsin. It is obtained from beef pancreas by a special extraction and purification process which assures a uniform preparation of high potency.

The ability of *Parenzyme* to hasten the resolution of inflammation and oedema has been demonstrated in animal and clinical studies.

**Mode of Action in Inflammation:** Inflammatory reactions to injury or infection are believed to be initiated by a chemical released from damaged cells, which increases the permeability of the capillaries and permits passage of fluid, fibrinogen and other substances into the tissue spaces.

Macro-molecules of fibrin are deposited in the lymphatics, in the network of the connective tissue and the small pores of the capillaries, decreasing the permeability and acting as a mechanical barrier. Fluid trapped in the intercellular spaces increases hydrostatic pressure and results in the mechanical closure of surrounding capillaries and lymphatics.



*Parenzyme* administered systemically is believed to concentrate in such areas where it acts as a depolymerase—reducing the size of the fibrin molecules, reversing the fibrinogen-fibrin reaction and facilitating the removal of fibrin from the capillaries and connective tissue network. Normal permeability is restored, intercellular fluid is released and circulation re-established. Further tissue damage is thus prevented and the healing process accelerated.

**Clinical Uses:** *Inflammation Associated with Peripheral Vascular Disease:* Phlebitis; phlebothrombosis, acute and chronic thrombophlebitis, diabetic cellulitis, varicose ulcers.

**Ocular Inflammation:** iritis, iridocyclitis, chorioretinitis.

**Pulmonary Inflammation:** loosening of bronchial plugs in severe conditions: bronchial asthma, emphysema, bronchiectasis.

**Traumatic Wounds:** contusions, fractures, sprains, post-operative tissue reactions.

**Inflammatory Skin Disorders:** Herpes zoster, psoriasis, dermatitis, cellulitis, carbuncles and furuncles, decubitus ulcers.

**Compatibility:** There are no known incompatibilities. Other medication, including anticoagulants and antibiotics, may be given with *Parenzyme* when indicated.

**Side Effects:** Occasionally a patient taking *Parenzyme-B* (buccal trypsin tablet) may experience slight local discomfort or tenderness after the tablet has been dissolved, but this complaint tends to dis-

appear after about 10 doses. If irritation persists, buccal medication should be discontinued for a day or two, and parenteral treatment substituted. If accidentally swallowed, the tablet causes no untoward effects, but is inactivated in the stomach.

**Contraindications:** *Parenzyme* has a wide margin of safety and is rarely contraindicated. However, it should be used with caution in patients with abnormalities of the blood clotting mechanism, such as haemophilia. Patients with severe renal or hepatic disease should be followed carefully during *Parenzyme* administration.

**Supplied:** *Parenzyme Aqueous* is supplied in a 2-vial package. One vial contains lyophilized trypsin 25 mg. In the other is the aqueous diluent. Five ml. of the diluent are withdrawn with sterile technique and transferred to the vial containing the trypsin. The addition of the diluent may be facilitated by inserting another sterile syringe needle to permit displacement of air. A clear solution results with shaking. Final concentration of trypsin is 5 mg./ml. Since the trypsin is in solution, further shaking is not required on withdrawal of subsequent doses.

*Parenzyme-B* is supplied in vials of 24 buccal tablets, each containing 5 mg. of trypsin.

**Dosage:** Clinical studies indicate that in many conditions *Parenzyme Aqueous* and *Parenzyme-B* are equally effective. However, in very severe or resistant cases, *Parenzyme Aqueous* is recommended.

**Adults:** *Parenzyme Aqueous*, 1 c.c. (5 mgm.) daily; *Parenzyme-B*, 1 tablet 4 times daily.

**Children:** Use half the above doses.

With both dosage forms, frequency of administration may be reduced as improvement occurs. Length of therapy will depend upon patient response. In chronic conditions (ulcers, some forms of thrombophlebitis) maintenance therapy will be required.

**Administration:** *Parenzyme Aqueous*. The injection should be made deep in the gluteal muscle. For best results a 20-gauge, 2-inch needle should be used. The outside of the needle should be wiped dry before use, after removal of the solution from the vial.

*Parenzyme-B*. The patient should place the tablet into the lower buccal pouch and bathe it vigorously with saliva. He should avoid moving it around with his tongue. Any portion of the tablet not dissolved within 10 minutes should be removed or swallowed. The patient should not swallow saliva or expectorate until the tablet has dissolved or been removed from the buccal pouch. The right and left lower buccal pouches should be used alternatively.

**Manufactured:** Under the control of The National Drug Company, Philadelphia, U.S.A.

**Marketed in South Africa by:** Mer-National Laboratories (Pty.) Ltd., P.O. Box 6742, Johannesburg.

**Distributed by:** Westdene Products (Pty.) Limited, P.O. Box 7710, Johannesburg.

### STAPHORAL

*Staphoral* is a purified staphylococcus toxoid for sublingual administration via the buccal mucosa.

It is intended for both prophylactic and therapeutic use against staphylococcal infections.

Published work has shown that the rise in anti-toxin titre of the blood following absorption via

the mucosa is as great as that obtained by parenteral immunization.

Sublingual administration obviates the unpleasant local and systemic reactions which are produced by immunization via the parenteral route and consequently provides a convenient means of prophylactic as well as therapeutic immunization.



*Staphoral* will be of great interest in surgery for its prophylactic use before major elective surgery as well as its use in burnt patients and in patients who have to be hospitalized for a considerable period.

The prophylactic use of *Staphoral* should also prevent infection by antibiotic-resistant strains of staphylococcus following post-operative broad-spectrum antibiotic therapy.

The use of *Staphoral* in dermatology is indicated in the treatment of furunculosis, recurrent carbuncles, hydro-adenitis, pustular acne and other staphylococcal infections of the skin and subcutaneous tissues.

In gynaecology and obstetrics immunization of the pregnant woman in the last trimester of pregnancy will protect the mother against mastitis and is expected to produce a significant antibody titre in the child.

In otorhinolaryngology, *Staphoral* therapy is indicated in subacute and chronic infections of the middle ear as well as sinusitis.

The use of *Staphoral* in internal medicine will be of value in the treatment of bronchitis as well as in the prophylactic treatment of elderly patients and patients who normally suffer from chronic respiratory diseases, particularly in times of influenza epidemics.

*Staphoral* is available as drops for sublingual administration in infants and young children and as sublingual tablets for older children and adults.

The course consists of one tablet (or 10 drops) twice daily for 15 days.

*Staphoral* is available in 1 oz. dropper bottles and bottles containing 30 tablets, both of which contain the full course of therapy.

Further literature and information available from the makers, Saphar Laboratories Ltd., Stephen Road, Ophirton, Johannesburg, or from their distributors, Keatings Pharmaceuticals Ltd., P.O. Box 256, Johannesburg.



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\**Med. Proc. 4:445 (1958)*

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*Organ-specific action experimentally proved, clinically corroborated*

**Indications:**

Atherosclerosis and circulatory disorders; endocrine insufficiency; menopausal troubles and presenile involution; mongolism and encephalopathies; chronic organ diseases such as myocardial degeneration, liver disease and the nephrotic syndrome.

*By now this method has been used extensively in South Africa by many medical practitioners and has proved its value.*

**Mode of Action:**

SICCACELL stimulates the insufficient organ or organ-system to functional regeneration. SICCACELL does not act by substitution.

**Contra-Indications:**

All acute diseases and specific chronic inflammations.



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## PENITRIAD

Maybaker (S.A.) (Pty.) Limited announce the introduction of *Penitriad* brand association of Penicillin VK and triple-sulphonamides for oral administration. Each tablet contains phenoxymethylpenicillin potassium equivalent to 60 mg. of the free acid, sulphadimidine 167 mg., sulphadiazine 167 mg. and sulphathiazole 167 mg.

*Penitriad* is indicated in the treatment of infections due to penicillin and sulphonamide-sensitive

organisms, including pneumococci, streptococci, *Staphylococcus aureus* and sensitive Gram-positive bacilli. In Gram-negative bacillary infections due to organisms of limited sensitivity to either penicillin or to sulphonamides, the activity of the combination is likely to be appreciably greater than that of either penicillin or a sulphonamide alone, notably in respiratory tract infections associated with the presence of *Haemophilus influenzae*.

The average adult dose is 2 tablets initially, followed by 1 or 2 tablets at 4- to 6-hourly intervals.

## REVIEWS OF BOOKS

## UROLOGY IN OUTLINE

*Urology in Outline.* By T. L. Chapman, Ch.M., F.R.C.S. (Eng.), F.R.F.P.S. (Glas.). 1959. (Pp. 174 + Index. With 138 Figs. 27s. 6d.). Edinburgh and London: E. & S. Livingstone Ltd.

Urological problems affect the general practitioner very intimately and although he does not need to concern himself with the technical details of a highly specialized field of practice, he would welcome a simple, lucid presentation of urological problems.

These requirements are even more important for the under-graduate medical student, whose overburdened life of study can be made very much easier by pursuing urology in the attractive fashion made possible by Mr. Chapman's monograph.

The author has produced what is virtually a book of pictorial mnemonics which bring the whole field of urology graphically into focus in the mind of the reader. He himself describes this type of presentation as 'somewhat unorthodox,' but most of us probably cope with the massive demands on our memory by mental imagery of one kind or another.

A typical instance of the great success which attains this method of presentation is the section dealing with *Control of Micturition* in which, in the course of 8 pages of clearly presented illustrations, the reader covers the infant and the adult bladder, the atonic bladder in relation to spinal lesions, the automatic bladder and the complications of the neurogenic bladder. In each case there is a presentation of the relevant type of bladder function (with a concluding diagram illustrating tidal drainage of the bladder).

On controversial issues the author has avoided dogmatism, giving both points of view.

This, together with the outstanding quality of the black-and-white line drawings, has made a great success of the systematic presentation of the problems of urology in a manner designed to create interest, understanding and knowledge.

## A TEXTBOOK OF MEDICINE

*Principles of Internal Medicine.* 3rd ed. Editors: T. R. Harrison, Raymond D. Adams, Ivan L. Bennett, Jr., William H. Resnik, George W. Thorn, M. M. Wintrobe. 1958. (Pp. 1,782 + Index. With 206 Figs. and 6 colour plates). New York: McGraw-Hill Book Company Inc.

This volume presents with comprehensiveness, in the course of 1,775 pages, the extensive field of medical practice in a manner which will be of value to the

undergraduate student as well as the medical practitioner.

At appropriate places the text is illustrated by beautiful colour plates and numerous black-and-white illustrations. The orthodox regional presentation of the manifestations of disease has been abandoned in favour of a much more physiological approach.

For the beginner nothing could be more valuable than the introductory chapter on the *Approach to the Patient*. This is followed by an excellent survey of the *Cardinal Manifestations of Disease*, viz. *Pain, Headache, Pain in the Chest, Acute Abdominal Pain and Ileus, Pain the Back and Pain in the Extremities*.

There are also general statements surveying disturbances in respiration and circulation.

The final part of the volume is devoted to the care of the patient and includes such useful topics as *Sedation and the Relief of Pain, Micturition*, etc. The last section of this practical part of the book is entitled *Iatrogenic Disorders*, i.e. disturbances produced in the patient by the practitioner himself.

This pointed review of the consequences of medical attention merits careful study, because everyone handling patients should be alerted to the way in which adverse effects can be produced in patients not only by the doctor's attitude, but also by the drugs which he employs in the treatment of disease.

Some patients have an 'uncanny capacity for misinterpreting the most innocent remarks and the most cautiously expressed opinions.' Iatrogenic illness will therefore never be completely eliminated, but if the practitioner is on his guard, opportunities of creating it will be substantially diminished.

The *Appendix* contains the useful set of Tables of laboratory values of clinical importance. These Tables make for rapid and effective consultation.

A triple column index of 57 pages concludes an excellent and virtually encyclopaedic review.

## THE GERIATRIC PATIENT

*The Care of the Geriatric Patient.* Edited by E. V. Cowdry, Ph.D., Sc.D. (Hon.). 1958. (Pp. 417 + Index). St. Louis: C. V. Mosby Co.

The value of this volume lies in the numerous aspects of the care of the aged dealt with by a variety of distinguished and experienced authors. The essays have been put together by Dr. E. V. Cowdry, a past President of the Gerontological Society and of the Second International Gerontological Congress.

With the prolongation of the life span which medicine has achieved in recent decades, the care of the elderly has assumed a far greater importance in medical practice than ever before.

Not only does this monograph deal with psychological aspects of geriatric care, but also with the geriatric issues raised by surgery, anaesthesia, dental care, nutrition, nursing, rehabilitation and hospitalization.

At p. 141, in a discussion on tranquilizing drugs, the interesting observation is made that 'in contrast to the barbiturates, the tranquilizing drugs, even in large doses, do not reduce cerebral oxygen consumption. Clinically, a potentiation of the action of relatively small doses of barbiturates or analgesics

occurs when these drugs are administered simultaneously with the tranquilizing drugs.'

This has an important bearing on anaesthetics and drug treatment generally.

The appeal of this volume is to all branches of medical practice. It provides an opportunity for us to familiarize ourselves with the problems of the care of the elderly, whether we are general practitioners or any of the great number of specialists who become involved in one or other aspect of geriatrics.

## CORRESPONDENCE

VULCO CHEMICAL COMPANY VS. VEEDIP LIMITED,  
S. D. SUTTON AND F. C. MARCUS

To the Editor: In terms of the settlement made you are authorized by the Respondents to publish the article annexed hereto.

'MODERN METHODS OF STERILIZING SURGEONS' GLOVES'

In the issue of 13 December 1958, an article was published in *Medical Proceedings* under the above heading. That article was the subject of proceedings brought by Vulco Chemical Company Limited, of Industria, Johannesburg, as Applicant, against Veedip Limited, S. D. Sutton of Slough, England, and F. D. Marcus, the representative of Veedip, Limited in Cape Town. Those proceedings have now been settled and the abovementioned Respondents have authorized the publication of the statement which follows:

### In Re

VULCO CHEMICAL COMPANY LIMITED (Applicant)  
VS.

VEEDIP LIMITED, S. D. SUTTON AND F. C. MARCUS  
(Respondents)

On 22 December 1958 in the Supreme Court of South Africa (Witwatersrand Local Division) the above Respondents were interdicted temporarily from further publishing the article entitled *Modern Methods of Sterilizing Surgeons' Gloves*. The aforementioned Interdict has now been made final by the consent of the Respondents.

Inasmuch as the said paper made reference to a statement that Dr. Hugh Starkey of the Department of Veterans' Affairs of Canada in an article published by him in the *Canadian Medical Journal* (1956) had found that Latex surgeons' gloves compared unfavourably with other types of gloves, the Respondents admit that this was due to a misunderstanding by Mr. Sutton of the following passage from that article, which is the only reference therein to surgeons' gloves.

'There is some suggestion that modern surgical rubber gloves are more easily punctured than their coarser predecessors and it has also been shown that the interiors of gloves quickly build up a considerable bacterial population in the course of an operation, staphylococci reappearing if the wearer had some on his skin before scrubbing. This mode of conveyance through punctured gloves may deserve attention.'

It will be observed, and has been confirmed by Dr. Starkey, that he made no comparison between different types of gloves, nor has any recommendation been made by hospitals of the Department of Veterans' Affairs in Canada relevant to the types of surgeons' gloves to be used therein.

This statement is issued by the Respondents in order to remove any wrong impressions which may have been created as a result of Mr. Sutton's article.

Attorneys for the Applicant.

Johannesburg.

[Dr. Hugh Starkey has since written to us, and has requested us to publish his comments, as under:]

'I am sorry to see that Mr. Sutton has apparently misunderstood my views and the evidence I have accumulated in relation to the conveyance of bacteria from surgeon's hands to operation sites through rubber gloves.

'In common with other observers, we have followed the build-up of bacterial populations inside surgeons' gloves and have found the usual steady increase in numbers in varying periods up to 1½ hours. We have also found that quantitative tests reveal quite wide individual variations—some surgeons showing a consistent tendency to build up large numbers of organisms, others consistently building up far smaller totals regardless of scrub techniques and skin counts before donning gloves. Different makes of gloves have not been compared.

'The basic data for my statement in my article of September 1956 as regards the puncturability of modern gloves has not been reinvestigated. At least three Canadian hospitals (not Government hospitals) have always made a point of inspecting their gloves for small leaks by the same method for about 35 years. Their records are not very accurate but these and older literature seem to indicate that in the early 1920's, minute leaks were found in about 8-12% of gloves, whereas in recent years, 14-24% rates seem quite common. Again, in these records no analysis has been made of the type of glove being examined. Because these records are not too reliable, I would preface any conclusions with the same words as used in 1956—"There is some suggestion that . . .". One of the most significant studies was that of Devenish & Miles in 1939 (*Lancet*, 236:1088).

'I would like to add that there is no regulation in respect to the type of surgical glove to be used in our hospitals of the Department of Veterans' Affairs of Canada. Chief Surgeons of the various hospitals order what they prefer.'—Editor].

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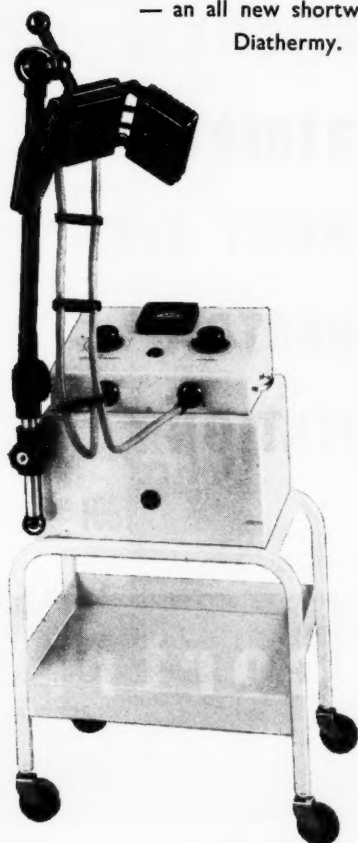
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**Dosage:** One to two teaspoonfuls every four hours.

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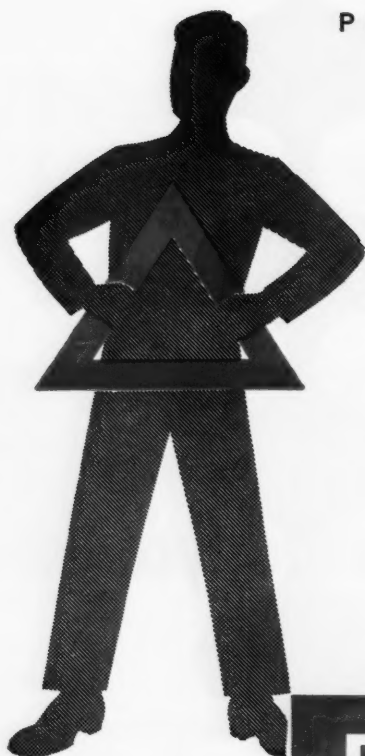
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**Deltacortril\***  
“ENTERIC”

Brand of prednisolone

**POTENCY:**

Tablets of 2.5 mg.  
prednisolone

**DOSAGE:**

Initially, two tablets b.i.d.  
Where necessary this can be  
increased to two tablets t.i.d.

**PACKS:**

Bottles of 100

The precision-formed enteric coating  
prevents gastric irritation but does not inter-  
fere with absorption of this most effective  
and safest of the proved corticosteroids.

\*\*Trade Mark of Chas. Pfizer & Co. Inc.

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*World's Largest Producer of Antibiotics*

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# THERAPEUTIC BRIEFS

## OF SELECTED *Lilly* PRODUCTS

A practical alternate  
to parenteral penicillin

### V-CILLIN K®

(PENICILLIN V POTASSIUM, LILLY)

Within 15 to 30 minutes, high blood levels are produced by V-Cillin K, a new, readily soluble form of clinically proved V-Cillin® (penicillin V, Lilly). It combines the virtue of acid stability with greater solubility. Twice as much absorption of penicillin as from buffered potassium penicillin G given orally. Greater total penicillaemia is produced by 250 mg. V-Cillin K t.i.d. than by 600,000 units of intramuscular procaine penicillin G. Also, high serum levels are attained.

Phosphorus-free  
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### PRENALAC® FORTE

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Prenalac Forte is available to physicians who prefer a phosphorus-free calcium for their obstetric patients. Intrinsic factor is provided to enhance the absorption and utilization of Vitamin B<sub>12</sub>. Liberal amounts of other essential vitamins are also included in the formula. Physicians may select from the Lilly family of vitamins either Prenalac® (prenatal nutritional supplements, Lilly), providing dicalcium phosphate, or Prenalac Forte containing calcium carbonate according to their personal preference.

Better control of  
diabetic patients

### LENTE INSULIN, LILLY

An intensive study of Lente Insulin reveals that, with some exceptions, control of stable diabetic patients is smoother and Insulin reactions are fewer when Lente Insulin is substituted for the Insulin used previously.<sup>1</sup> The author found Lente Insulin to be 'the purest long-acting Insulin yet developed' and believes that it should be used whenever it achieves good diabetic control in the absence of persistent allergy.

1. J.A.M.A., 159: 1611, 1955

Eliminates four major  
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### PARTEL™

(DITHIAZANINE IODIDE, LILLY)

Partel is effective orally, usually within five days, against four of the most common worm infections: pinworm, whipworm, strongyloidiasis, roundworm. Partel also inhibits and sometimes eliminates hookworm infection. Partel is administered in easy-to-swallow tablets on a convenient daily schedule. The dosage for the treatment of a single infection is also effective against massive and multiple infections.

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A new "stubborn spectrum" antibiotic

# KANTREX<sup>TM</sup>

Kanamycin Sulfate

## "A THERAPEUTIC TRIUMPH" in staphylococcal endocarditis\*

### TYPICAL CASE HISTORY

L. B., an adult male, was diagnosed as having tricuspid endocarditis with multiple pulmonary septic infarcts, due to a penicillin-resistant *Staphylococcus aureus* hemolyticus. He was acutely ill and, after receiving 24 million units of penicillin a day, plus 2 Gm. of erythromycin, continued a "striking downhill course."

Intramuscular kanamycin (KANTREX) was started at a dosage of 0.5 Gm. t.i.d. for 3 days, after which it was raised to 1.0 Gm. t.i.d. and continued for 5 weeks. Following this, the dosage was lowered to 0.5 Gm. t.i.d. for 2 weeks. No evidence of any kind of kanamycin toxicity was observed during the 7½ weeks of therapy.

A prompt temperature drop occurred by the fourth day of Kantrex therapy. Subsequently, X-rays showed resolution of the septic infarcts.

The patient was discharged as recovered on 7/2/58, and a clinical follow-up since then showed him to be entirely well. This case was described by the investigator as "a therapeutic triumph."

**KANTREX** — a new antibiotic derived from *Streptomyces kanamyceticus* — is bactericidal against a wide variety of Gram-positive and Gram-negative organisms, including strains of *Micrococcus pyogenes* var. *aureus* — the most notorious of the "resistant staph."



\*Sol Katz, District of Columbia General Hospital, Washington, D. C.: Personal communication.

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